

REVISION OF THE GENUS NOTELAEA (OLEACEAE)

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THE GENUS *Notelaea* is endemic to eastern Australia and Tasmania, although it was first described from a plant under cultivation in France, introduced from what is known today as New South Wales. As treated here the genus contains nine species only; those described from outside Australia being excluded and disposed of in other genera.

Seven species are very closely related and much confusion has existed in their recognition and differentiation. A critical redetermination of many misnamed specimens has helped to clarify the species' limits and the examination of a large range of herbarium material, together with a very limited, but invaluable, experience of some of the plants in the field, has led me to believe that the recognition of these seven taxa is justified at the rank of species. However, experimental and field studies, if and when they are carried out, may modify the rank at which the taxa are finally classified. The other two species, although related, are sufficiently distinct to warrant the establishment of two new sections for their accommodation; their differences from the seven species mentioned seem insufficient to justify generic separation.

Hybridization between closely related species has not been proved experimentally but the combination of characters exhibited by a very few specimens can only be explained on the assumption that this has occurred. Under *Notelaea microcarpa* mention is made of a putative hybrid with *N. ovata*, and *N. microcarpa* is thought to have introgressed with *N. longifolia* on occasion, as shown, for example, by the variation in a relict population near Dorrigo, New South Wales (represented by the range of specimens in *Green 1519 a-l*) cited below under *N. longifolia* f. *intermedia*.

Field experience of two or three species was made possible for me by funds from the Arnold Arboretum (where I had the honor of being a staff member at the time) together with National Science Foundation Grant No. GB1545, and most grateful acknowledgment is made for this generous support. I should also like to express my sincere thanks to Mr. L. A. S. Johnson of the Royal Botanic Gardens, Sydney, for much information gleaned from his knowledge of the species in the field and especially for the many valuable annotations he attached to the herbarium material when it was sent on loan from Sydney; to Messrs. A. G. Floyd and H. C. Hayes of the Forestry Commission of New South Wales, Coff's Harbour, for their generous help with time, transport, and local knowledge of the species in northern New South Wales; and to Miss Mary Grierson and Miss Judy Appenzeller for the maps and figures. Finally, I should like to record my grateful appreciation to the directors and curators of the cited herbaria for the loan of material or facilities for study. All the material

cited has been examined, and the respective herbaria are indicated by the abbreviations published in the *Index Herbariorum*, Ed. 5, 1964.

Notelaea Ventenat, *Choix de Plantes* 25. t.25 1804; R. Brown, *Prodr.* 523. 1810; Endlicher, *Gen. Pl.* 572. 1838; A. DC. in DC. *Prodr.* 8: 290. 1844; Bentham, *Fl. Austral.* 4: 298. 1868 & in Bentham & Hooker f. *Gen. Pl.* 2: 678. 1876; C. Moore, *Handb. Fl. New S. Wales* 320. 1893; Knoblauch in Engler & Prantl, *Nat. Pflanzenfam.* 4(2): 10. 1892; F. M. Bailey, *Queensl. Fl.* 3: 972. 1900; Johnson, *Contr. New S. Wales Natl. Herb.* 2: 411. 1957.

Rhysospermum Gaertner f. *Fruct.* 3: 232. t.224. fig. 2. 1807.

Postuera Rafinesque, *Sylv. Tellur.* 10. 1838.

Evergreen shrubs or small trees. *Leaves* opposite, simple, glabrous to velutinous, lamina thickish or coriaceous, entire or crenulate, venation obscure or clearly reticulate. *Inflorescence* axillary, decussate with terminal flower, from 1–3 superposed buds, bracts broadly ovate to narrowly lanceolate, early deciduous. *Flowers* hermaphrodite. *Calyx* 0.3–1.2 mm. long with 4 more or less triangular lobes 0.1–1 mm. long. *Corolla* of 4 petals joined in two pairs at the base of the stamens, the pairs free, or only just joined at the base (in *N. ligustrina*), lobes 1.2–2.5 mm. long, broadly ovate, rounded or more or less acute (in *N. ligustrina*), induplicate-valvate or slightly imbricate in the bud (in *N. ligustrina*), concave and enclosing the stamens, closely so and raised on a common “stalk” at maturity in *N. johnsonii*. *Stamens* 2, anthers 0.8–1.5 mm. long (0.3 mm. in *N. johnsonii* and closely invested by the corolla), filaments short 0.1–0.5 mm. long. *Ovary* triangular flask-shaped, 0.8–2 mm. long without well differentiated style, terminal stigma more or less bilobed 0.1–0.5 mm. long. *Drupe* ellipsoid to more or less globose, 5–20 mm. long by 4–16 mm. broad; mesocarp soft when ripe and purplish-black, but white, pink or red in some species; endocarp hard, 0.1–0.6 mm. thick.

TYPE SPECIES: *Notelaea longifolia* Vent.

KEY TO SECTIONS

1. Corolla lobes induplicate-valvate in the bud (FIG. 1, A & B).
 2. Paired corolla lobes and stamens sessile at maturity, the bases of adjacent pairs touching or almost touching, and surrounding the ovary; anther lobes about the same size as the connective (FIG. 2, B & C); flowers yellow, cream or white. NOTELAEA.
 2. Paired corolla lobes and stamens stalked at maturity, the bases of adjacent pairs separate and not surrounding the ovary, even in bud; anther lobes small in proportion to the connective (FIG. 4, D & E); flowers purplish-pink. MISCHOPETALA.
1. Corolla lobes imbricate in the bud (FIG. 3, B). LIGUSTRINA.

KEY TO THE SPECIES OF NOTELAEA

1. Venation of leaf clear and more or less reticulate above.

2. Leaf venation below raised and clear, at least as prominent or almost as prominent as that above, unless masked by a velutinous indumentum.
3. Veins, after the primary ones, showing progressive diminution in size, coarsely reticulate, secondary veins merging with the approximately equal-sized marginal thickening to the lamina, ripe fruit broadly ovoid to subglobular, only a little longer than broad.
4. Lamina narrowly ovate to narrowly lanceolate, (3.5-)6-10(-16) cm. long, margin usually entire, except for juvenile or sucker growth, base acute or obtuse and long acuminate into the decurrent base, reticulation below usually at least a little less prominent than that above, with primary veins usually curving forward slightly towards the leaf apex before dividing, even in the broadest leaves; inflorescence usually borne in the axil of the subtending leaf, the lowest pedicels arising in the lower half of the inflorescence, often near the base; shrub or small tree to 7 m. high. 1. *N. longifolia*.
4. Lamina broadly ovate or ovate to, occasionally, narrowly ovate (rarely lanceolate or elliptic), (2.5-)3-9(-14) cm. long, margin more or less crenulate, base rounded, although some of the largest and narrowest leaves with acute leaf bases, but even then with distinct if sometimes shallow and irregular crenulations, reticulation below usually as prominent as that above with primary veins more or less straight until they divide, not curving forward towards the leaf apex; inflorescence usually a little above the axil of the subtending leaf, pedicels often arising only in the upper half of the inflorescence; low shrub to 1 m. high. 2. *N. ovata*.
3. Veins, after the primary ones, all more or less evenly, finely, and prominently reticulate, secondary ones not clearly merging with the marginal thickening to the lamina; ripe fruit ellipsoid-ovoid, clearly longer than broad. 3. *N. venosa*.
2. Leaf venation below usually more obscure than above, unless masked by a velutinous indumentum.
5. Outline of leaves lanceolate or elliptic, (1-)1.5-5 cm. broad.
6. Reticulation of veins raised and more or less prominent above, the surface minutely but prominently punctate below; inflorescence 1-3 cm. long; paired corolla lobes, with stamens, sessile at maturity; fruit 7-9 mm. long; central and northern east Queensland. 4. *N. punctata*.
6. Reticulation of veins not raised above, often obscure, the surface below not prominently punctate; inflorescence 4-8 cm. long; paired corolla lobes, with stamens, stalked at maturity (FIG. 4, D & E); fruit 18-20 mm. long; limited area of northeasternmost New South Wales and southeasternmost Queensland. 9. *N. johnsonii*.
5. Outline of leaves narrowly or very narrowly lanceolate to linear, (0.2-)0.3-1.5(-3) cm. broad.
7. Venation of upper leaf surface more or less clear and raised, the primary veins making an angle of 15°-30° with the midrib; lamina (3-)5-15(-30) mm. broad; Queensland and the central and northern western-slope country of New South Wales. 5. *N. microcarpa*.
7. Venation of upper leaf surface more or less obscure, except for

- slightly raised primary veins which make an angle of about 40° with the midrib; lamina (2-)3-8(-14) mm. broad; central tablelands country of New South Wales. 7. *N. neglecta*.
1. Venation of leaf obscure above.
 8. Leaves linear to narrowly lanceolate, more than 7, usually at least 10 times as long as broad; ripe fruit 5-7 mm. long.
 9. Breadth of leaf (1.5-)2-5(-7) mm., venation totally obscure; inflorescence 4-10 mm. long; southern Queensland and northern tablelands country of New South Wales. 6. *N. linearis*.
 9. Breadth of leaf (2-)3-8(-14) mm., venation obscurely visible; inflorescence 10-20 mm. long; central tablelands of New South Wales. 7. *N. neglecta*.
 8. Leaves broadly to narrowly lanceolate, up to 7 times as long as broad; ripe fruit 8-20 mm. long.
 10. Primary and other veins obscure above and below, leaves (2-)3-6(-8.5) cm. long; inflorescence 1.5-3.5 cm. long; petals more or less acute (FIG. 3, A); fruit 8-12 mm. long, varicolored; Tasmania, Victoria, and southeasternmost New South Wales. 8. *N. ligustrina*.
 10. Primary veins just visible below, leaves (4-)7-10(-12) cm. long; inflorescence 4-8 cm. long; petals rounded, enveloping the stamens (FIG. 4, D & E); fruit 18-20 mm. long, bluish-black; northeasternmost New South Wales and southeasternmost Queensland. 9. *N. johnsonii*.

Notelaea sect. Notelaea

Sect. *Eunotelaea* Knoblauch in Engler & Prantl, Nat. Pflanzenfam. 4(2): 10. 1892.

The largest and most widespread section, characterized by the induplicate-valvate aestivation of the corolla. It is closely related to sect. *LIGUSTRINA* which, however, exhibits imbrication of the corolla in the bud. In most species the ripe fruit is invariably purplish-black in color but in *Notelaea punctata* it has been recorded as "varicolored," in *N. linearis* as "white and translucent" or "rich blue" and in *N. punctata* as white and red, as well as dark purple to blackish.

1. *Notelaea longifolia* Ventenat, Choix de Pl. 25. t.25. 1804; Desfontaines, Hist. Arbr. 1: 120. 1809; R. Brown, Prodr. 523. 1810; Sprengel, Syst. Veg. 1: 35. 1824; A. DC. in DC. Prodr. 8: 291. 1844; Ettingshausen, Blatt-Skel. Dikot. 69. t.26, fig. 9. 1861; Reichenbach f. Neuholl. Pfl. Amelia Dietrich 9. 1866; Bentham, Fl. Austral. 4: 229. 1868; F. Mueller, Fragm. Phytogr. Austral. 8: 43. 1873, & Syst. Census Austral. Pl. 92. 1882; F. M. Bailey, Synop. Queensl. Fl. 303. 1883; F. Mueller, Key Syst. Vict. Pl. 2: 39. 1885, & 1: 357. 1887-8; F. M. Bailey, Queensl. Woods, 85. 1888 & 97. 1889; F. Mueller, Second Syst. Census Austral. Pl. 156. 1889; Maiden, Useful Native Pl. Austral. 579. 1889; F. M. Bailey, Cat. Pl. Queensl. 29. 1890; C. Moore, Handb. Fl. New S. Wales 320. 1893; F. M. Bailey, Queensl. Fl. 3: 973. 1900;

Dixon, Pl. New S. Wales 214. 1906; Guilfoyle, Austral. Pl. 40 [1911]; F. M. Bailey, Comprehensive Cat. Queensl. Pl. 311, 319. *fig.* 292. [1913]; Maiden & Betche, Census New S. Wales Pl. 172. 1916; Ewart, Handb. Forest Trees Vict. Foresters 407. 1925; Francis, Austral. Rain-Forest Trees 327. 1929; Domin, *Bibliot. Bot.* 22(89) (*Beitr. Fl. Pflanzengeogr. Austral.* 1(3): 512): 1066. 1929; Ewart, *Fl. Vict.* 941. 1930; Audas, *Native Trees Austral.* 242 [1935]; Anderson, *Trees of New S. Wales*, ed. 2. 132, 271, 338. 1947; Bean in Chittenden, *Dict. Gard.* 3: 1379. 1951; Beadle, Evans & Carolin, *Handb. Vasc. Pl. Sydney Distr. & Blue Mts.* 348. 1963.

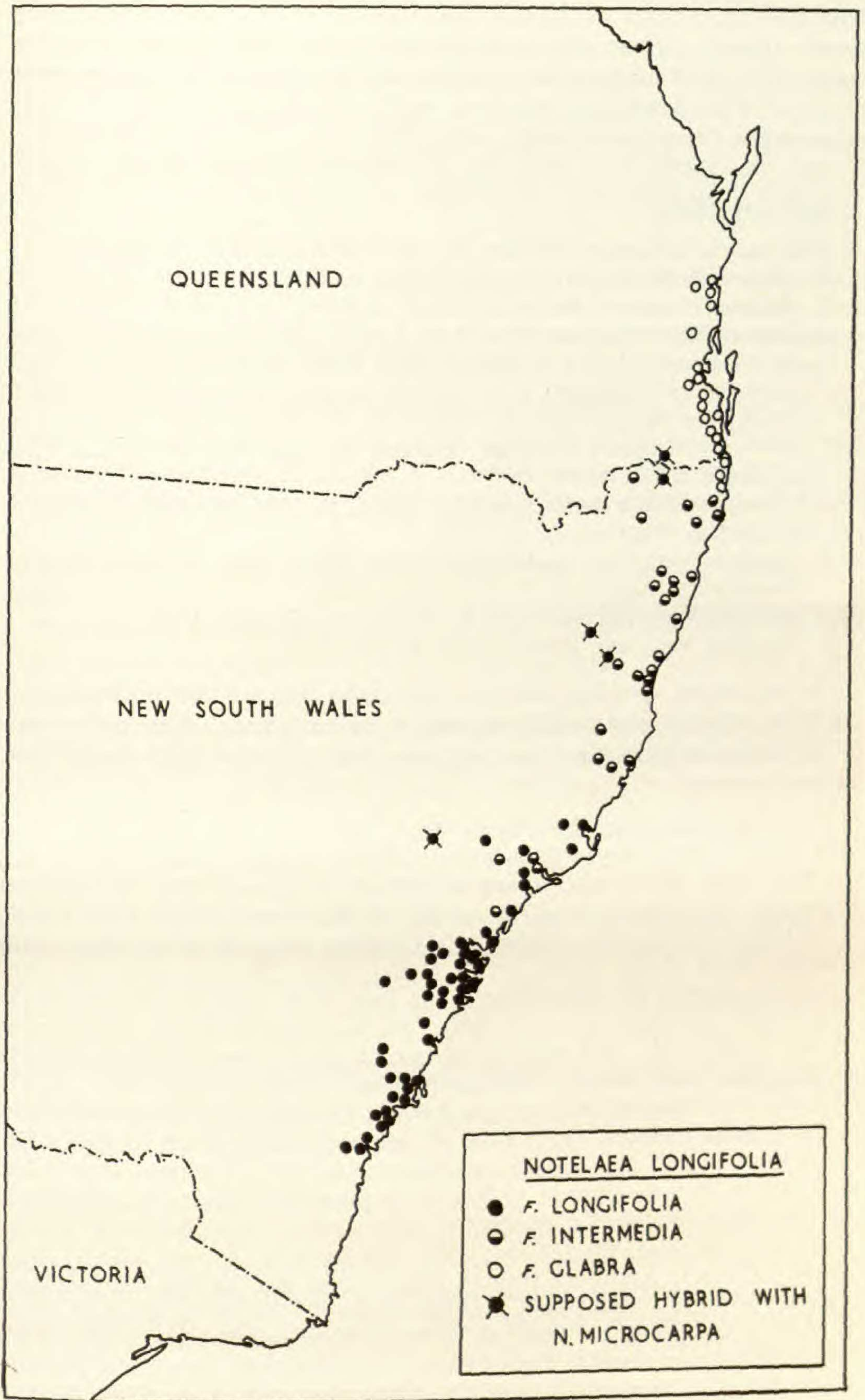
Evergreen shrub or small tree up to 7 m. tall (sometimes to 14 m. *vide* Anderson, *loc. cit.*), bark finely fissured, finely pustular to fairly smooth, mid to dark gray-brown, blaze granular; young stems densely puberulent or velutinous to glabrous. *Leaves* glabrous, glabrate, puberulous or velutinous above or below; petioles glabrous to velutinous, (2-)5-15(-25) mm. long; lamina lanceolate, narrowly ovate or elliptic, occasionally narrowly lanceolate or ovate, (3.5-)6-10(-16) cm. long by (1-)2-3.5(-5.5) cm. broad; margin somewhat thickened, entire or obscurely and somewhat irregularly crenulate; apex acute or long acute, finely pointed if undamaged; base acute to obtuse, long acuminate into the petiole; venation reticulate and raised above and below, except when obscured if densely velutinous, veins below usually a little less prominent than those above, (5-)6-8(-10) primary veins per side arising at an angle of 40°-70° with the midrib, usually curving forwards slightly towards the apex before branching, even on the broadest leaves, basal pair of primary veins usually arising at an acute angle in the decurrent base of the lamina. *Inflorescence* axillary, 1(-2) per axil, decussate, lowest pedicels usually in the lower half, often near the base, glabrous or puberulous, often minutely so and scattered, 1-2.5 cm. long, lengthening after anthesis, (5-)7-11(-13)-flowered; upper bracts 1-2 mm. long, thin, ovate to lanceolate, puberulous or glabrous and minutely ciliolate, early deciduous; basal pair thick, pubescent to glabrous (in northeastern plants), 1-3 mm. long, acute-acuminate, deciduous except for the persistent fused basal portion. *Flowers* hermaphrodite, yellow or pale yellow; pedicels 1-4 mm. long, accrescent in fruit. *Calyx* glabrous, 0.5-1 mm. long with 4 more or less triangular lobes, often acutely pointed, 0.5-0.8 mm. long. *Corolla* induplicate-valvate, lobes 4, 1.5-2.5 mm. long, in pairs joined in the lower half with the filament, concave. *Stamens* 2, 1-2 mm. long, more or less enclosed within the concave petals; anthers 1-1.5 mm. long with a distinct terminal appendage 0.2-0.3 mm. long; filaments short, 0.5 mm. long. *Ovary* flask-shaped, 1.2-1.5 mm. long, tapering into a style about 0.5 mm. long with 2 short stigmatic lobes 0.2 mm. long. *Drupe* ovoid, dark purple or bluish black, 1-1.6 cm. long by 0.8-1.2 cm. broad; endocarp hard, pointed ovoid, 8-12 mm. long by 5-8 mm. broad, 0.3-0.5 mm. thick.

Notelaea longifolia is the best known and most widespread species of the

genus, with a distribution stretching from the area of Bateman's Bay in southern New South Wales to the southern part of the Wide Bay district of Queensland. A number of formal taxonomic varieties have been described but the most striking, var. *velutina*, is here transferred to *N. microcarpa* (see below under that species). When this is done, and a large number of specimens are critically redetermined, especially after the careful delimitation of *N. ovata*, *N. venosa*, *N. punctata* and *N. microcarpa*, one is left with a far more homogeneous species in which the only obvious variation is that in degree of pubescence. When the localities for the specimens are plotted on a map, together with a symbol to indicate their hairiness in three simple categories of pubescent, glabrate or glabrous, it is found that *N. longifolia* occupies a coastal strip and exhibits a cline in the degree of pubescence, with velutinous or pubescent plants in the south and glabrous plants in the north (MAP 1). The southernmost specimens are most densely hairy, often velutinous, while around Sydney the amount of pubescence varies greatly; often densely velutinous and only slightly velvety specimens being found in the same area (e.g. *Johnson & Constable* NSW 52347 & 52348 from Little Forest, 7 miles WNW. of Milton, 10 Sept. 1960). In northernmost New South Wales and in Queensland, *N. longifolia* is quite glabrous, and in the intervening area the leaves of the specimens examined are all glabrate with a fine puberulence on the young stems and bud scales only. Considerable thought has been given to the question of whether this cline should be divided taxonomically; clearly any division will be artificial, but it is believed that names would be useful, for frequently it may be convenient to refer to a plant exhibiting one of the extremes of pubescence. This then raises the question of the taxonomic rank to be employed. None of the formal infraspecific ranks are particularly suitable yet the appropriate biosystematic term of clinodeme expressly excludes a nomenclatural connotation. Diagnosis, in this case, is dependent on variation in one character only, that of degree of pubescence, so although a distinct distributional pattern in this character exists, the ranks of subspecies and variety seem of too great a consequence so the conventional rank of form is chosen and appropriate names are published below. (Incidentally, the use of variety would compel the employment of Domin's highly inappropriate epithet of *decomposita* for the glabrous plant from the northern end of the range — see below.)

In annotations on the Sydney herbarium covers L. A. S. Johnson has summarized the habitat occupied by *Notelaea longifolia*: "Sometimes found within rainforest and often on rainforest margins but also commonly in eucalypt forest, though not on the poorest siliceous soils. In the poor Hawkesbury sandstone country it is found chiefly in the gullies or near salt-water estuaries (often on rocky slopes here) where there is some enrichment of the soil nutrients." Also, "in gullies in wet sclerophyll forest — sometimes in patches of rainforest."

In addition to being the most widespread species, *Notelaea longifolia* also appears to be central in its relationship to the others. Perhaps it represents the descendants of the basic stock from which the other species



MAP 1. Distribution of *Notelaea longifolia* and forms.

have evolved, for each of the other species of sect. *NOTELAEA* appears very closely related. Where they meet, hybridization seems to take place occasionally with *N. microcarpa*, a species characteristic of the western-slope country. The distribution of those specimens of possible hybrid origin examined in this revision is indicated on MAP 1.

Forma *longifolia*

"*Olea apetala*" Andrews, Bot. Rep. 5: t.316. 1803, non Vahl (1794).

Rhysospermum nervosum Gaertner f. Fruct. 3: 232. 1807.

R. ellipticum Gaertner f. loc. cit. t.224, fig. 2. 1807.

Notelaea rigida Desfontaines, Hist. Arbr. 1: 120. 1809.

Postuera longifolia (Vent.) Rafinesque, Sylv. Tellur. 10. 1838.

Notelaea "ovata" Endlicher, Icon. Gen. Pl. xi. t.55. 1838, non R.Br. (1810);
Lindley, Veg. Kingdom 616. fig. 1846.

N. nervosa (Gaertner f.) Steudel, Nomencl. ed. 2. 2: 198. 1841; A. DC. in DC. Prodr. 8: 291. 1844.

? *N. laurifolia* Kunth, Index Sem. Hort. Berol. 12. 1846, & in Walpers, Repert. Bot. Syst. 6: 742. 1847.

N. longifolia Vent. var. *candolleana* Domin, Bibliot. Bot. 22(89) (Beitr. Fl. Pflanzengeogr. Austral. 1(3): 514): 1068. 1929.

N. longifolia Vent. var. *rigida* (Desf.) Domin, loc. cit. 1066. 1929.

N. longifolia Vent. var. *typica* Domin, loc. cit. 1929.

Young stems, petioles, leaves (especially below) and inflorescence rachides more or less densely pubescent to velutinous. The pubescence of the leaf sometimes short and inconspicuous but more or less persistent, at least below.

SELECTED EXSICCATAE. New South Wales. Bateman's Bay, June 1906, *Boorman* (NSW 33491); Boyne State Forest, NE. of Nelligen approx. 180 m. alt., 22 Nov. 1966, *Pullen* 4203 (CANB 161997-9); Currawon State Forest, near Bateman's Bay, June 1959, *L.J.W. & J.G.T.* 3663 (BRI 35461); Lake Burrill, S. of Milton, 12 Jan. 1937, *Hadley* 2404 (*Rodway* 6239) (K, NSW 33416); near Canjola, South Coast, 6 Dec. 1937, *Hadley* 2620 (*Rodway* 6236) (K, NSW 33412); Comerong Is., Shoalhaven R., 18 Sept. 1932, *Rodway* 880 (6231) (K, NSW 33408); Cabbage-tree Creek, against the road between Nowra & Currarong, 22 May 1964, *Willis* (MEL 19628); gully near Barber's Creek (Tallong), *Forsyth & Hamilton* (NSW 33483); Illawara ("Sydney woods"), *Macarthur* 174 (K, syntype of var. *candolleana*; BM, isosyntype); Cronulla, Oct. 1919, *Cheel* (NSW 33528); Sydney, *Clowes* (K, syntype of var. *candolleana*); Port Jackson, 1803, *R. Brown* ("2849") (BM, K); Manley Beach, Nov. 1863, *Wilhelmi* (LE, P); The Spit, Middle Harbour, Sydney, 14 Nov. 1949, *Constable* (K, NSW 11316); Hornsby, May 1917, *Blakely* (A, BRI 7934, C, NSW 33453); near Harry's R., central Cox's R., S. of Blue Mts., 23 Dec. 1951, *Whaite* 1096 (K, NSW 22139); Little Wheeny Creek to Kurrajong Heights, about 350 m. alt., 10 Aug. 1953, *Johnson* (K, NSW 24963); Pulbah Island, Lake Macquarie, 27 Oct. 1941, *Messmer, Bryce & Rupp* (NSW 33447); 6 miles N. by W. of Raymond Terrace, 1 May 1960, *Story* 7275 (CANB 80051); Flyer's Creek, near Buladelah, Apr. 1924, *Rupp* 21 (NSW 33555); Crawford R., near Buladelah, Oct. 1902, *Cheel* (NSW 33442); Wallamba State Forest, near Nabiab, 12 Aug. 1955, *McDonald* (NSW 33516); Waukivory Creek, Gloucester, Sept. 1897, *Maiden* (NSW 33500); 16 miles W.

of Dungog, 5 May 1960, *Story* 7346 (CANB 80364); 10 miles NNE. of Ravensworth, 23 March 1960, *Story* 7145 (CANB 80379). Without locality: 1770, *Banks & Solander* (BM, E, ? isotypes of *Rhisospermum nervosum*); Hb. Horne-mann, ded. Desfontaines (C, ? isotype of *N. rigida*); *Caley* (BM, G).

Cultivated. AUSTRALIA: Botanic Gardens, Sydney, Feb. 1917, *Blakely* (NSW 33549); Botanic Gardens, Adelaide, 20 Dec. 1930, *J. F. Bailey* (K); Botanic Garden, Hobart, 31 Jan. 1932, *White* 8246 (A, BRI 7944); Botanic Gardens, Melbourne, *F. Mueller* (BM, MEL 19623). FRANCE: ex hort. Cels, ex herb. Ventenat (G, lectotype) & ex herb. Desfontaines (FI, ? isolectotype); Hort. Paris, Orangerie, 23 Oct. 1819, ex herb. *J. Gay* (K, topotype of and labelled as *N. rigida* Desf. Arb.); Jardin des Plantes de Paris, 1818, *Perrottet* (G). GERMANY: Hort. Berlin, without collector (C). GREAT BRITAIN: Hort. Kew, 1794, without collector (BM); Isles of Scilly, Tresco Abbey, 18 Sept. 1953, *Dorrien-Smith* (K).

This form is distinguished from the others by the more or less densely pubescent or even velutinous indumentum on the young stems, leaves, and inflorescence rachides. The type, a cultivated specimen, is distinctly hairy (although less pubescent than much of the wild material) and, at the turn of the 18th century, was almost certainly introduced from the Port Jackson area, from which most of the early introductions of Australian plants were made.

Typification has not been straightforward. In all probability *Notelaea longifolia* was originally described by Ventenat from a living plant grown in the garden of M. Cels and it is possible that no type specimens, as we know them today, were prepared. However, there is no doubt about the identity of the species for the protologue was beautifully illustrated and, thanks to the help of M. Gilbert Bocquet of Geneva, to whom I express my thanks, I learned that a specimen from M. Cels' garden, which had been in the Ventenat herbarium, is today in the Geneva herbarium. This I have examined on loan and designated as lectotype.

Notelaea rigida was similarly described from a cultivated plant, this time from the Orangerie in the Jardin des Plantes in Paris and a specimen, although collected some nine years later, has been seen in the Kew Herbarium with this origin and this name attached. The genus *Rhisospermum*, described by C. F. Gaertner, was based on fruit from the collection of Sir Joseph Banks, who accompanied Capt. Cook on the first of his famous voyages; no authentic type has been seen but there is a Banks & Solander collection at the British Museum (Natural History), with a duplicate in Edinburgh, unfortunately without fruit in both cases.

Notelaea laurifolia, described by Kunth in 1846 from a plant cultivated in the Berlin Botanic Garden, was attributed to New Zealand, but, as far as is known, none of the related New Zealand plants had been introduced at that time and the admittedly somewhat inadequate description fits *N. longifolia*. The type in the Berlin Herbarium was presumably destroyed during the war, so that the exact identity of Kunth's plant must remain uncertain until a duplicate or other authentic specimen is perhaps found elsewhere. For the present the best disposition of the name seems to be under *N. longifolia*.

The typification of the varieties described as new by Domin was more difficult at first sight but, on learning that the specimens upon which he had based his new taxa, other than those which were in his own collection, are often at Kew, and usually without annotation, the types were easily located by comparison of the labels with his protologues. *N. longifolia* var. *decomposita* is dealt with under f. *glabra* below. Var. *candolleana* is a hairy form with narrowish leaves. The reference to "Sydney woods" on the label of the Macarthur syntype seems to have been taken by Domin as a locality whereas the reference is to a timber or wood specimen, No. 174, sent from Sydney to the Paris Exhibition of 1854. Finally, var. *pedicellaris* was found to belong to *N. venosa*, under which species it is now included.

A specimen, *Cabbage* 2702, collected on 15 May 1911, between Baerami and Dunman in the region of the Upper Hunter in New South Wales (NSW 33540) appears of hybrid origin with *N. microcarpa*. The leaf shape is like that of *N. microcarpa* but the fruit, which is immature, is too large for this species and looks as though it would have developed to the size normal for *N. longifolia*.

The extent to which the foliage of juvenile, sucker or other strongly growing shoots differs from that of adult plants cannot be settled with certainty from herbarium collections, unless these are specially made, but in *Notelaea longifolia* they appear to be larger and broader than usual, more markedly reticulate and with the margin crenulate. *Pullen* 4203 from Boyne State Forest, New South Wales, is represented in the Canberra Herbarium by three sheets, two of which show normal adult foliage, one with fruit, while the third (CANB 161998) has large broadly ovate-lanceolate leaves, 10–13 cm. long by 4.5–5.5 cm. broad with rounded base and short petioles 2–3 mm. long. The field notes say "leaves of sterile branch larger than those of adult branches." Specimens in the Sydney Herbarium annotated as juvenile consist of unattached leaves 18–25 cm. long by 8.5–9.2 cm. broad with petioles 10–15 mm. long which, although not particularly rounded at the base, are strongly reticulate and more crenulate than usual. These specimens are: Patonga, N. bank of Hawkesbury R. near the mouth, N.S.W., Sept. 1936, *Blakely* (NSW 33449) and Bulbararing Lake, near Kincumber, N.S.W., 17 June 1905, *Maiden* (NSW 33448).

Forma intermedia P. S. Green, f. nov.

Caulibus junioribus et bracteis externis gemmarum minute puberulis; inflorescentiarum rachidibus minute et dissite puberulis; foliis junioribus et petiolis glabratis dinoscenda.

SELECTED EXSICCATAE: New South Wales. Wattagan State Forest, W. of Dora Creek, 15 Sept. 1954, *Constable* (K, NSW 30732); Port Stephens, Aug. 1911, *Boorman* (NSW 33445); Dungog to Clarendetown, 29 May 1934, *Fraser* (NSW 33443); Clarendetown, 7 Nov. 1936, *Fraser & Vickery* (NSW 33444); 16 miles ENE. of Singleton, 26 March 1960, *Story* 7195 (CANB 78754, K); Port Macquarie, Oct. 1892, *Maiden* (A); Ellenborough to Long Flat, 19 Oct. 1953, *Johnson* (K, NSW 26257); Ralf's Riverlet, Nov. 1897, *Maiden* (NSW 33441); Carrai Carrai State Forest, 30 miles approx. W. of Kempsey, 11 June 1958, *Constable*

(κ, holotype; BM, NSW 46234, isotypes); Nambucca Heads, June 1910, *Boorman* (NSW 33440); Bellingen, Dec. 1938, *Hewitt* (NSW 33437); Dorrigo State Forest, about 750 m. alt., 4 Oct. 1930, *White* 7513 (BRI 7937); Coff's Creek, Coff's Harbour, 4 Nov. 1963, *Hayes* in *Green* 1515 (A, κ); Glenugie Peak, 6 Nov. 1963, *Green* 1525 (A); Brickmaker's Creek, 4 miles SE. of Ramornie Crossing, July 1922, *Blakely & Shiress* (NSW 33476); Smith's Creek, 7 miles NE. of Ramornie Crossing, July 1922, *Blakely & Shiress* (NSW 33473); Coal Ridge, 10 miles N. of Ramornie Crossing, July 1922, *Blakely & Shiress* (NSW 33472); Harwood Is., Clarence R., 10 Feb. 1922, *Helms* 458 (A, c); Ballina, Sept. 1892, *Bäuerlen* 853 (A, NSW 33464, z); Dunoon Road, 7 Nov. 1963, *Hayes & Floyd* 1 (A); Casino, Dec. 1916, *McAuliff* (NSW 33468-33470); Koyogle, Dec. 1917, *McLean* (G, NSW 33467); Drake, Oct. 1901, *Boorman* (NSW 44087); Acacia Creek, via Killarney, May 1905, *Dunn* 112 (NSW 44088).

Cultivated. AUSTRALIA: Garden Palace Grounds, Sydney, Apr. 1898, *Camfield* (NSW 44057); Botanic Gardens, Melbourne, *F. Mueller* (MEL 19624).

Introggression between *Notelaea longifolia* f. *intermedia* and *N. microcarpa* var. *velutina* appears evident from the small population of *Notelaea* I examined on 5 Nov. 1963 adjacent to the Nymboida River near Dorrigo, New South Wales. Specimens were collected from each of the small trees seen, *Green* 1519 a-l (A), which exhibit a considerable degree of intermediate variation in leaf shape, veining, and pubescence. It is suggested that in the not too distant past, with the felling of the forest and establishment of agriculture, there has been considerable ecological upheaval in this area and that *N. longifolia* and *N. microcarpa*, which were formerly separated, came into contact. Hybridization between f. *intermedia* and *N. microcarpa* seems likely for a few other intermediate collections from New South Wales which are cited here.

Paddy's Land State Forest, about 900 m. alt., 12 Apr. 1955, *Turner* 39 (NSW 33535); Unumgar State Forest, 13 March 1963, *Jones* 2370 (CANB 136002); & near Mt. Lindsay, Dec. 1943, *Jones* (BRI 7924); and from the Moreton District of Queensland: the Ranch, foot of Wilson's Peak, 17 Jan. 1933, *Michael* 1983 (BRI 7920, NSW 33532).

Forma glabra P. S. Green, f. nov.

Caulibus junioribus, foliis, bracteis externis gemmarum et inflorescentiarum rachidibus manifeste glabris.

Notelaea reticulata A. DC. in DC. Prodr. 8: 291. 1844; Ettingshausen, Blatt-Skel. Dikot, 69. t.22, fig. 5. 1861.

N. longifolia Vent. var. *decomposita* Domin, Repert. Sp. Nov. 12: 96. 1913 & *Bibliot. Bot.* 22(89) (Beitr. Fl. Pflanzengeogr. Austral. 1(3): 514): 1068. 1929.

SELECTED EXSICCATAE: Queensland. MORETON DISTRICT: Mouth of Currumbin Creek, 7 Nov. 1929, *White* 6509 (BRI 7931, holotype; A, isotype); Tamborine, 21 Feb. 1963, *W. T. Jones* 2346 (CANB 136129); Stacks Creek, Logan R., 2 Dec. 1931, *Michael* 1934 (BRI 7938); near Beenleigh, about 1 mile along Barr's Road, 4 Nov. 1964, *L. S. Smith* 12238 (BRI 64517-9, κ) & 12239 (BRI 64522-3); Goodna (Woogaroo Creek), Dec. 1916, *White* (BRI 9701, NSW 33462); Taylor Range, 15 July 1943, *Clemens* 42465 (A); Brisbane River, *F. Mueller* and *Hill* & *F. Mueller* (κ, syntypes of var. *decomposita*) & Apr. 1876, *Bailey* (BRI 7935,

κ); Ithaca Creek, Brisbane, 30 Oct. 1949, *White 13149* (BRI 42314); between Brisbane and Redcliffe, bank of South Pine R., 16 Dec. 1930, *Hubbard 5499* (BRI 7922; κ); Moreton Bay, Sept. 1829, *A. Cunningham* (G, type of *N. reticulata*; κ, isotype) & islands, Moreton Bay, Sept. 1829, *A. Cunningham 8* (A, BM, κ, ? isotypes of *N. reticulata*); at the creek of Mr. Archer's Station (E. of Kilcoy), 15 Sept. 1843, *Leichardt* (NSW 33459); Eumundi, Nov. 1892, *Simmonds* (A); Noosa Heads, 26 May 1951, *Johnson* (NSW 33460). WIDE BAY DISTRICT: Lake Cootharaba, *Keys* (BRI 7910 & 7930); Imbil, March 1918, *Weatherhead 393* (BRI 7933).

New South Wales. Dunoon, 7 Nov. 1963, *Green 1527* (A, κ); mouth of Brunswick R. by Pacific Highway, Brunswick Heads, 30 May 1964, *Schodde (& Hayes) 3549* (CANB 135634-5); Tweed Heads, Nov. 1903, *Maiden & Boorman* (NSW 33463).

Cultivated. AUSTRALIA: Botanic Gardens, Sydney, Dec. 1895 & Feb. 1898, *Camfield* (NSW 33557) & Dec. 1925, *Blakely & Anderson* (NSW 33558).

At the northern end of its range *Notelaea longifolia* f. *glabra* is not always easy to distinguish from *N. punctata*. The distributions of the two overlap slightly, as represented, for example, by the collections of *Keys* from Lake Cootharaba (BRI 7910 & 7930), *Francis* from Cootharaba (BRI 7932) and *Weatherhead* from Imbil (BRI 7933 & 9697), all in the Wide Bay District of Queensland. Where there is fruit there is little difficulty in identification: BRI 7932 & 9697 have small fruits characteristic of *N. punctata*, whereas BRI 7933 has the larger ones typical of *N. longifolia*. Vegetatively the prominence of the secondary veins below appears to be the best character for distinguishing most material, at least in the dried condition, for in both species the leaves are punctate. Habit appears significant and herbarium studies alone are inadequate to settle satisfactorily the problem of specific differentiation in this instance. Careful field observations, coupled, perhaps, with biosystematic studies, are called for.

Examination of the type of *Notelaea reticulata* DC. from Moreton Bay showed it to be the glabrous expression of the species, as might be expected from the locality from which it was collected. Similarly, the type of *Domin's* var. *decomposita*, from the Brisbane River, is the glabrous form and was found to be based in part on a very floriferous specimen (actually with the flowering stage just past) from the flowering shoots of which the leaves had just dropped, so that the inflorescences might, at first glance, be interpreted as compound.

2. *Notelaea ovata* R. Brown, Prodr. 524. 1810; Sprengel, Syst. Veg. 1: 35. 1824; A. DC. in DC. Prodr. 8: 291. 1844; Ettingshausen, Blatt-Skel. Dikot. 69. t.26, figs. 7 & 8. 1861; Bentham, Fl. Austral. 4: 299. 1868; F. Mueller, Fragm. Phytogr. Austral. 8: 43. 1873, & Syst. Census Austral. Pl. 92. 1882; F. M. Bailey, Synop. Queensl. Fl. 303. 1883; F. Mueller, Second Syst. Census Austral. Pl. 156. 1889; Maiden, Useful Native Pl. Austral. 580. 1889; F. M. Bailey, Cat. Pl. Queensl. 29. 1890; C. Moore, Handb. Fl. New S. Wales, 320. 1893; F. M. Bailey, Queensl. Fl. 3: 972. 1900; Dixon, Pl. New S. Wales, 214. 1906; F. M.

Bailey, Comprehensive Cat. Queensl. Pl. 311. 1913; Maiden & Betche, Census New S. Wales Pl. 172. 1916; Audas, Native Trees Austral. 242. [1935]; Bean in Chittenden, Dict. Gard. 3: 1379. 1951; Beadle, Evans & Carolin, Handb. Vasc. Pl. Sydney Distr. & Blue Mts. 348. 1963.

N. longifolia Ventenat var. *ovata* (R. Br.) Domin in Bibliot. Bot. 22(89) (Beitr. Fl. Pflanzengeogr. Austral. 1 (3): 513): 1067. 1929, quoad syn., excl. fig. et spec. cit.

Evergreen shrub 0.5–1 m. tall, usually with several stems from an old common stock; young stems densely puberulous, sometimes minutely so. *Leaves* glabrous or minutely puberulous above and below when young, especially on the midrib and veins, rarely subvelutinous; petioles puberulous, sometimes minutely so, 1–6(–10) mm. long; lamina thickish, more

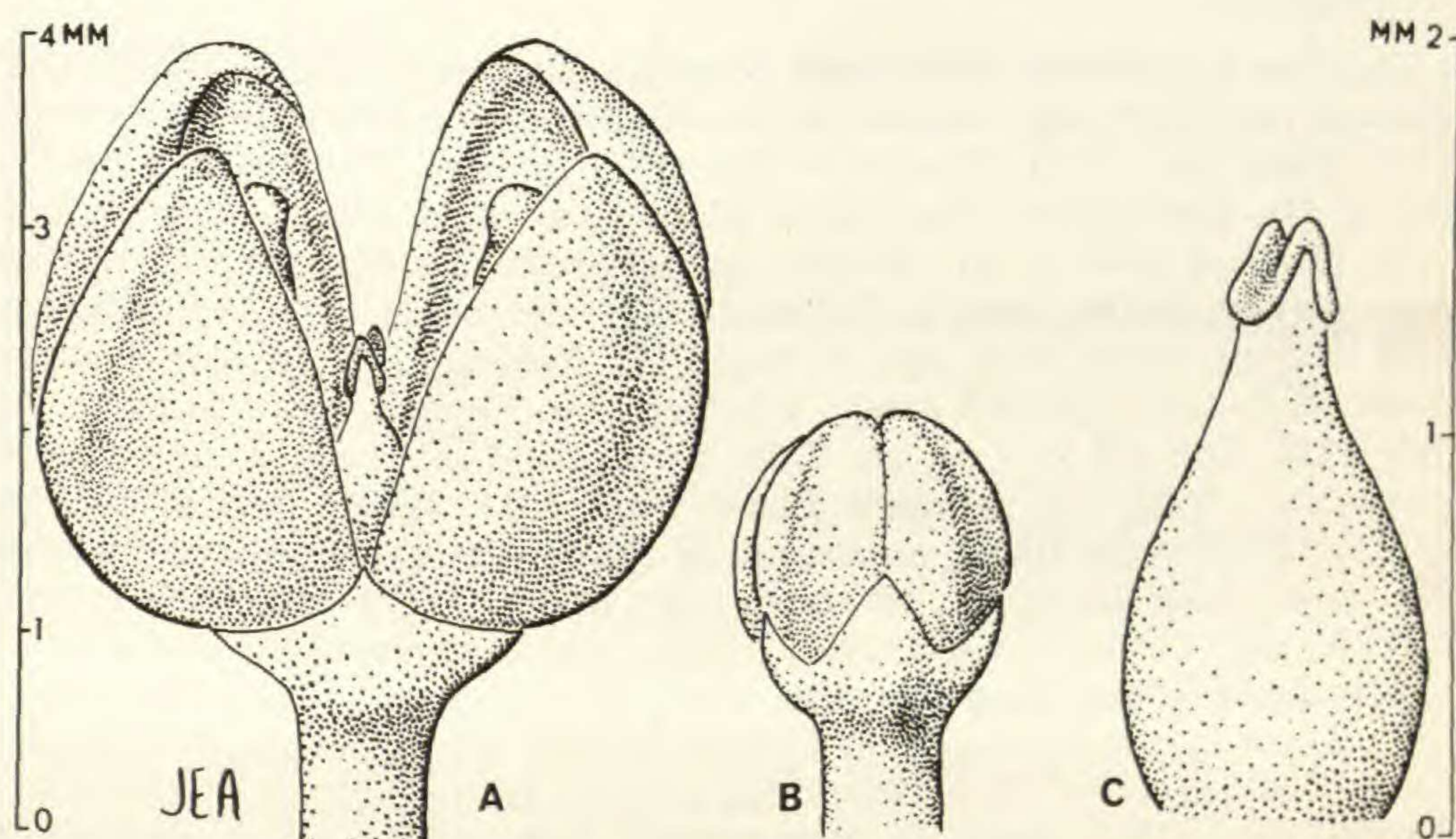


FIG. 1. *Notelaea ovata*. A, flower; B, young bud; C, ovary. (Drawn from Green 1522a).

or less coriaceous, punctate, very broadly ovate to ovate to narrowly ovate, more rarely lanceolate or broadly elliptic to elliptic (or even narrowly elliptic), (2.5–)3–9(–14) cm. long by (1.2–)1.8–3(–6) cm. broad; margin crenulate, sometimes irregularly so, rarely almost entire, somewhat thickened; apex acute, sometimes obtuse, occasionally slightly acuminate, tip often minutely apiculate; base rounded (to rarely subcordate, or, on the narrowest leaves, more or less acute), attenuate into the petiole; venation reticulate and raised above and below, (5–)6–7(–11) primary veins per side. *Inflorescence* axillary, 1(–2) per axil, in the case of a single inflorescence up to 5 mm. above the axil with an unopened bud in between, decussate, lowest pedicels often in the upper half, puberulous or scattered and minutely puberulous, especially towards the base, (1–)1.5–3.5 cm. long, (3–)5–9(–11)-flowered; occasionally freakish, up to 6 cm. long with secondary branching and 15 or more flowers per inflorescence; upper bracts

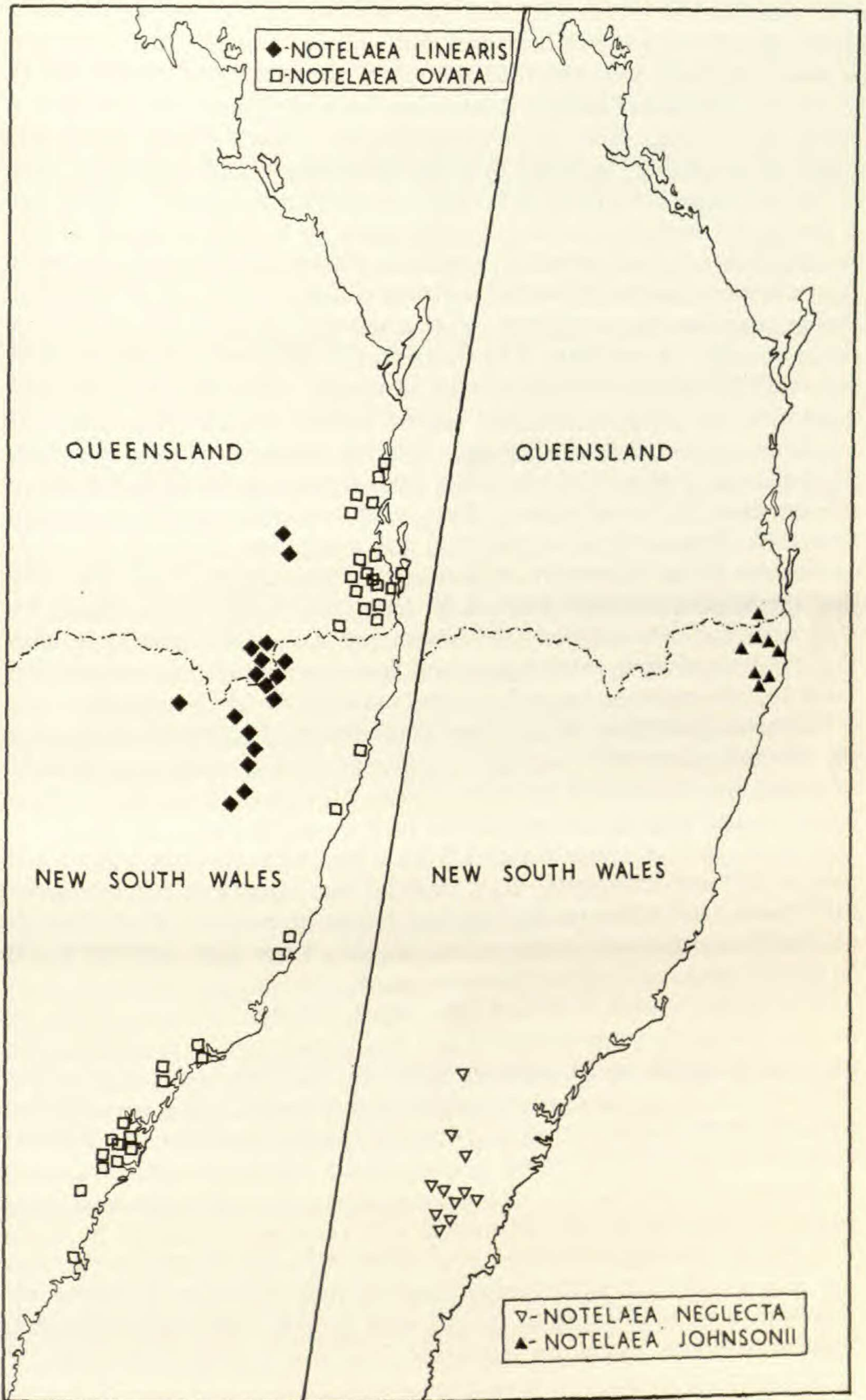
1–3 mm. long, lanceolate, sometimes almost subfoliaceous, minutely puberulous, early deciduous; basal bracts, thickish puberulous, but most often raised above the axil 3–10 mm. on the inflorescence axis. *Flowers* hermaphrodite (FIG. 1), pale yellow; pedicels 1.5–6 mm. long. *Calyx* glabrous 0.5–1 mm. long, with 4 more or less triangular lobes, slightly erose or sometimes minutely ciliolate, 0.5–0.7 mm. long. *Corolla* induplicate-valvate, lobes 4, 1.5–2.5 mm. long, in pairs joined in the lower half, concave. *Stamens* 2, 1–1.75 mm. long more or less enclosed within the concave petals, with a slight terminal appendage; filaments short 0.5 mm. long. *Ovary* flask-shaped, 1–1.5 mm. long tapering into a style 0.3–0.5 mm. long with 2 short stigmatic lobes 0.2 mm. long. *Drupe* ovoid with whitish semitransparent sarcocarp (*vide* B. S. Cole) 1–1.25 cm. long (?) by 0.8–1 cm. broad (?); endocarp hard, pointed ovoid, 7 mm. long by 5 mm. broad, 0.3 mm. thick.

SELECTED EXSICCATAE. Queensland. MORETON DISTRICT: Coolum, April 1945, *Clemens* (BRI 9704); Mt. Coolum, 24 March 1945, *Clemens* (K); Beerwah, Sept. 1919, *White* (BRI 9718); Elimbah, 4 Dec. 1961, *McKee* 9731 (CANB 120610); top of Mt. Tunbubudla, Glass House Mountains, about 300 m. alt., 10 Aug. 1930, *Hubbard* 3606 (A, K); Kedron, near Brisbane, *Shirley* (BRI 9720); Dinmore Pottery, 19 Oct. 1964, *L. S. Smith* 12171 (BRI 64521, K); Taylor Range, near Brisbane, about 200 m. alt., 24 Aug. 1930, *Hubbard* 3757 (A, K); Brisbane River, 1863–1865, *Dietrich* (BM); hills near Mt. Gravatt, near Brisbane, 11 July 1930, *Hubbard* 3317 (A, BRI 9708, K); about 5 miles SE. of Ipswich, 16 June 1957, *Pedley* (K); Russell Island, Sept. 1913, *White* (BRI 9709, NSW 44035); Stradbroke Island, *Scortechini & Bailey* (BRI 9710); Mount Maroon, NE. gorge, about 840 m. alt., 10 March 1962, *Everist* 7111A (BRI 38264); Coomera R., near Canungra, 9 Oct. 1949, *White* 13124 (BRI 42315).

New South Wales. Trial Bay, Feb. 1882, *Betche* (NSW 33551); Barcoogere State Forest, about 6 miles N. of Corindi, 6 June 1957, *Johnson & Constable* (NSW 47501) & 6 Nov. 1963, *Green* 1522 a–f (A); Hastings River, *Beckler* (K); Kendall, Sept. 1932, *Bailey* (A, NSW 44036); Nelson's Bay, Port Stephens, 6 Feb. 1937, *Vickery* (LE, NSW 44037); Wallsend, Oct. 1899, *Boorman* (NSW 44039); Killara district, Oct. 1948, *Price* (NSW 44042); North Rocks, Sept. 1803, *Caley* (BM); Lindfield, 23 Oct. 1927, *White* 5139 (BRI 9717, K); Port Jackson, *R. Brown* (BM, holotype; E, K, P, isotypes); Hurstville, April 1901, *Camfield* (NSW 44050); Bargo River, Dec. 1902, *Boorman* (A, NSW 44052); Huskisson, Jarvis Bay, Dec. 1925, *Rodway* (K).

Although the epithet borne by this species is very appropriate for most individuals and specimens, the leaves are fairly variable, both in size and in the proportions of length and breadth, so that on occasion the outline closely resembles that of *Notelaea longifolia*. However, the species may be separated by the more regular and prominent reticulation of the veins in *N. ovata* and the more definitely crenulate margin.

MAP 2 shows that *Notelaea ovata* is a coastal species, where it is found in Eucalypt forest on sandy soils or, in the Sydney district, according to L. A. S. Johnson, on soils derived from argillaceous shale, and in Queensland, to judge from the field notes with herbarium specimens, on sandstone hills and ridges. The tallest growth recorded on the labels of all the speci-



MAP 2. Distribution of *Notelaea ovata*, *N. linearis*, *N. neglecta* and *N. johnsonii*.

mens examined is 4 feet (1.2 m.) but whether the species ever attains higher growth than this is not recorded. There is no doubt, both from personal observation in the field and from the notes and comments on labels, that plants are often cut back by fire and then regenerate from a woody basal stock, often of considerable age. Plants flower when only a foot or so tall but, to judge from the specimens examined, rarely fruit. In fact the range in fruit size and color is somewhat uncertain. A specimen in the Sydney herbarium collected at Medowie by R. S. Cole (NSW 44038) has fruits in an envelope which appear as though they were fleshy when ripe; the mesocarp has shrivelled and it is difficult to be sure of the exact dimensions when they were fresh, so that the sizes given in the description above are only an estimate. The fruits on this specimen are said to have been whitish with a semitransparent sarcocarp, although purplish-black is the color one might expect from related species, and the field notes with a specimen collected by Pedley near Ipswich, Queensland (κ) state that the fruits are purple. Unfortunately, there are no fruits still attached to the specimen of this collection at Kew, so that it is impossible to compare them with those of the Cole collection and impossible to be certain of the correctness of the statement in Bentham's *Flora Australiensis* (4: 299) that this species has the "fruit of *N. longifolia*." Just how variable the fruit color and size can be is not known but it is worth bearing in mind that the fruit of *N. ligustrina* may vary from purple through red and pink to white. Observations on fresh fruiting material are badly needed.

In Barcoongere State Forest, New South Wales, I collected shoots from six different plants in a population scattered over a small area in order to record the variation in leaf size (*Green 1522 a-f*). Lanceolate-elliptic leaves 11 cm. long by 3.5 cm. broad, broadly ovate leaves 6.5 by 5 cm., and diminutive but ovate leaves 3.5 by 2 cm. were all represented, each from a different individual. Bud material was also fixed for cytological examination and given to Dr. Barbara Briggs of Sydney. From this she obtained a chromosome count of $n = \text{ca. } 23$. I am most grateful to Dr. Briggs for permission to publish this count.

The species of sect. *NOTELAEA* are closely related but it is not known to what extent they are interfertile. Chromosome numbers, such as they are known, appear to be uniform, $2n = 46$, but only one collection has been seen which appears to be a hybrid of this species. This was collected by L. S. Smith (no. 12180 *a*) at Dinmore Pottery, Moreton Bay District, Queensland, on 19 Oct. 1964 in *Eucalyptus fibrosa*-*E. maculata* forest on hillside (BRI 64516, κ). This specimen has the leaf shape of a large-leaved *N. microcarpa* but the margin and venation is that of *N. ovata*. L. S. Smith collected undoubted *N. ovata* at the same locality on the same day (his no. 12171) and to judge from the distribution of *N. microcarpa* this species is to be expected in this area as well. The hybrid specimen bears a few very immature fruits and it is quite possible that the two species are interfertile.

("Definitions of Rare or Hitherto Undescribed Australian Plants" 50). 1855, & in Hooker's Jour. Bot. & Kew Gard. Misc. 8: 163. 1856; Anderson, Trees New S. Wales, ed. 2. 132. 1947; Beadle, Evans & Carolin, Handb. Vasc. Pl. Sydney Distr. & Blue Mts. 349. 1963.

N. longifolia Vent. var. *pedicellaris* Domin, Repert. Sp. Nov. 12: 96. 1913 & Bibliot. Bot. 22(89) (Beitr. Fl. Pflanzengeogr. Austral. 1 (3): 514): 1068. 1929.

Evergreen bushy *shrub* or *small tree*, 1.5–6(–9) m. tall; bark grayish, smooth or eventually rough, flaky gray-brown (fide *Schodde* 3502); stem glabrous or puberulous, especially when young, sometimes minutely so. *Leaves* glabrous or minutely puberulous at first above and below; petioles glabrous or minutely puberulous at first, 5–15(–20) mm. long (0.5–3(–8) mm. long in northern plants); lamina thickish, more or less coriaceous, obscurely punctate, lanceolate to occasionally narrowly ovate or elliptic, (4–)6.5–12.5(–17) cm. long by (1–)2–4(–6) cm. broad, in semi-juvenile shade leaves (NSW 44065 & MEL 19621) petiole 20–30 mm. long, lamina ovate, 15–21 cm. long by 7.5–9.5 cm. broad; margin slightly thickened, entire or very shallowly and finely crenulate, especially in the upper half, sometimes extremely shallowly so; apex acute, sometimes slightly acuminate; base acute, attenuate into the petiole, to obtuse (rounded or subcordate in northern plants); venation raised, finely and evenly reticulate, especially below, (6–)7–10(–11) primary veins per side. *Inflorescence* axillary, 1–2(–3) per axil with a bud or buds between it and the axil but usually not more than 1.5 mm. above the axil, decussate, 1–3(–7) cm. long, 7–11(–17)-flowered, often fairly dense and occasionally the terminal 5(–7) flowers subumbellate, glabrous; bracts 1.5–3 mm. long, broadly ovate, ciliolate, early deciduous, basal bracts 1–2.5 mm. long, blunt, glabrous, somewhat persistent or the fused bases persistent. *Flowers* hermaphrodite, yellow or greenish-white, pedicels glabrous, 2–5(–10) mm. long. *Calyx* 0.5 mm. long with 4 somewhat irregular, more or less triangular, lobes. *Corolla* induplicate-valvate, lobes 4, 1.5–2.5 mm. long, joined in pairs for about 0.5–1 mm., thickish, concave. *Stamens* 2, 1–1.75 mm. long with a broad filament 0.3 mm. long and a slight terminal appendage. *Ovary* broad flask shaped, 1–1.5 mm. long, tapering to an imperceptible style with bilobed stigma 0.2 mm. long. *Drupe* dark purple to blackish (–white and red, fide E. Gippsland 165–66, no collector, MEL 19626), slightly glaucous, ellipsoid-ovoid 1.5–2 cm. long by 1–1.4 cm. broad; endocarp ovoid, pointed 1.1–1.5 cm. long by 0.8–1 cm. broad, 0.4–0.6 mm. thick.

SELECTED EXSICCATAE. New South Wales. River Hastings, *Fraser* (κ); Williams River, 7 Jan. 1934, *Fraser & Vickery* (NSW 44063); Mt. Scrumbo, 19 miles E. of Aberdeen, 11 Oct. 1960, *Story* 7497 (CANB 85286, NSW 53859); Mt. Royal, 25 miles E. of Aberdeen, 25 Mar. 1960, *Story* 7179 (CANB 80176, κ, NSW 67494); ridge between Chichester R. and Kerripit R., NNW. of Dungog, 1 Apr. 1954, *McDonald* (NSW 43030); O'Sullivan's Gap, 10 miles N. of Bulahdelah, 30 Nov. 1946, *Gilbert* (NSW 6498); Mt. Warrowolong, Olney, 300 m. alt., 24 Aug. 1949, *Constable* (NSW 11517); Wandabyne, Nov. 1922, *Blakely &*

Shiress (NSW 44064); track between Victoria Falls Lookout and Falls, about 2 miles E. of Mt. Victoria, 6 May 1959, *Constable* (K, NSW 47326); Springwood, 5 Dec. 1953, *McKee* 847 (K, NSW 26323); Cedar Creek, Central Kowmung R., 26 Mar. 1948, *Johnson* 348/28 (NSW 5025); Blue Mountains, March 1910, *Domin* 7757 (PR); near King's Fall, Oct. 1819, *A. Cunningham* 94/1819 (K); Mt. Jellore, 16 Nov. 1912, *Cheel* (NSW 44071); Illawara, Oct. 1818, *A. Cunningham* (K), 1855 *Macarthur* (BM) & *Oldfield* (K); near Robertson, Nov. 1918, *Dunn* 27 (NSW 44073); Jamberoo-Carrington Falls road, 22 Jan. 1955, *Constable* (BM, G, K, NSW 32245); Nowra-Kangaroo Valley, near top of pass on Nowra side, about 350 m. alt., 14 Jan. 1936, *Rodway* 2113 (6242) (A, BRI 7929, K, NSW 33417); Milton, 8 Nov. 1914, *Cabbage* 4121 (NSW 44078); Sugar Loaf Mt., Monga, near Braidwood, Jan. 1915, *Boorman* (NSW 44079); Eurobodalla, 1 Jan. 1950, *Whaite* 480 (NSW 44080); Ohlson's Creek, near Narooma, against the road to Tilba Tilba, 23 May 1964, *Willis* (K, MEL 19629); Quaama, Dec. 1915, *Dunn* (NSW 44082); near Tanja (Bega distr.), 1948, *Phillips* (NSW 44083); Eden to Pambula, Nov. 1901, *Maiden* (NSW 44085); Twofold Bay, Sept. 1860, *F. Mueller* (K, holotype of *N. longifolia* var. *pedicellaris*); Womboyn Lake, 135 m. alt., 12 Oct. 1954, *Constable* (A, K, NSW 36595).

Victoria. Genoa River, 1880, *Reader* (MEL 19607); Mallacoota, *Hart* (MEL 19609 & 19610); Mt. Drummer, 11 June 1959, *L. J. W. & J. G. T.* 3619 (BRI 34850); sources of Delegate River, 1887, *Merrah* (MEL 19611); Broadribb River, Jan. 1855, *F. Mueller* (MEL 19620, holotype; K, MEL 19632, isotypes); Orbost, 20 Oct. 1903, *Grove* (G, K, LE); North Arm, Lakes Entrance, 17 Aug. 1944, *Willis* (MEL 19621)

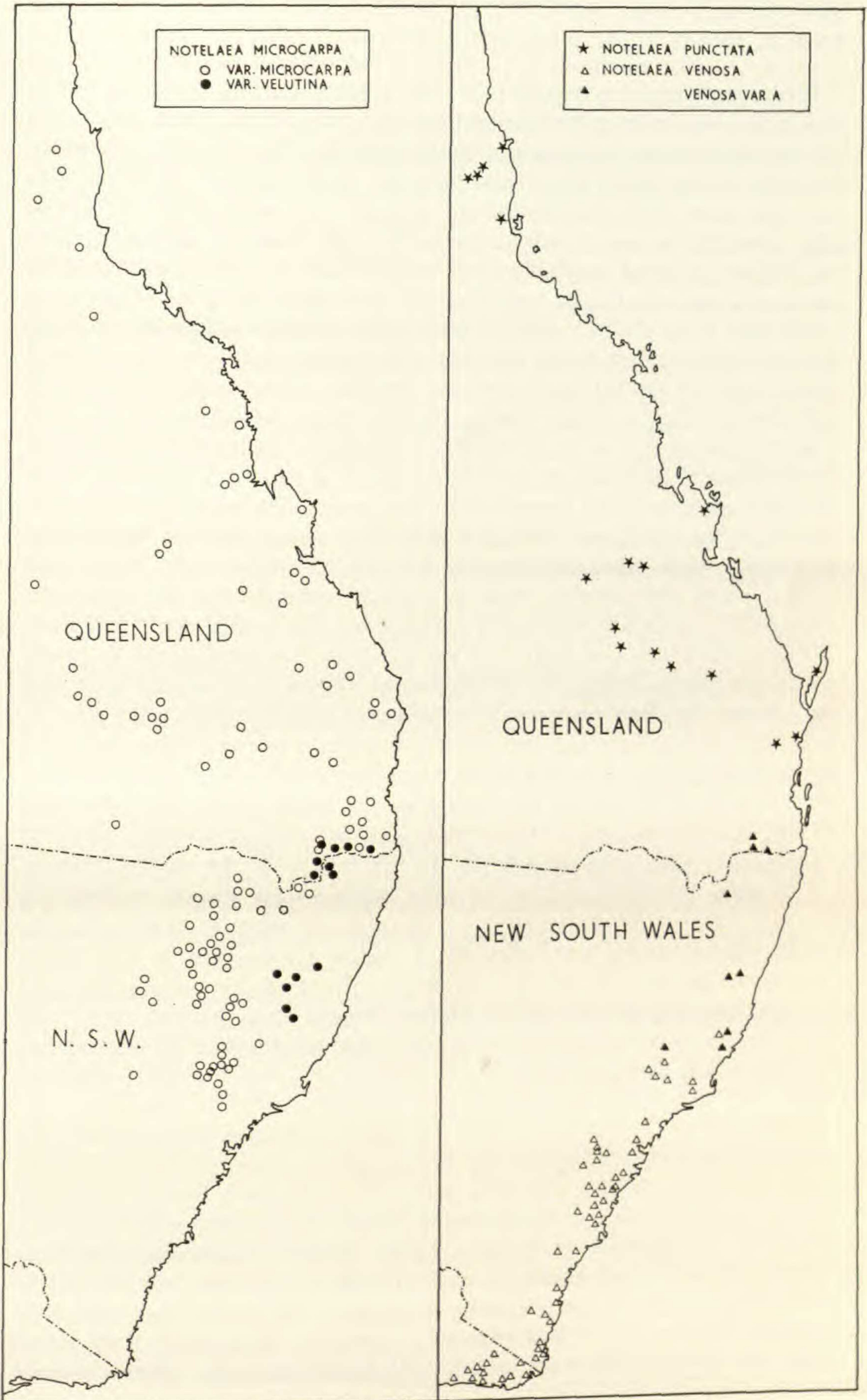
This species is closely related to *Notelaea longifolia* and *N. ovata* and has often been misidentified as the former, although its main distribution is more southerly (MAP 3). However, it may readily be distinguished by the fine and even reticulation of the leaves, especially below. This species may also be recognized by the fruit which is relatively large and slightly longer in proportion to its width. When ripe the fruit is quite fleshy and bluish-black with a slight glaucous bloom, although the label with MEL 19626 from E. Gippsland says "white and red." According to annotations by L. A. S. Johnson it is characteristic of sandstone soils in or around rainforest, though often of the lower, poorer type, as in mountain gullies, etc., but sometimes in more open habitats or in patches of undergrowth of rainforest species in wet sclerophyllous forest.

Var. A.

Leaves subsessile or with very short petioles, 1.5–3 mm. long; leaf base subcordate or broadly rounded.

Queensland. MORETON DISTRICT: top of Mt. Mitchell, about 1050 m. alt., 19 July 1930, *White* 6886 (BRI 9692); Wilson's Peak, *Peterson* (BRI 9706); top of Mt. Lindsay, about 1200 m. alt., 10 Aug. 1932, *Whitehouse* (BRI 9693).

New South Wales. Mount Mackenzie, Tenterfield, 4 Nov. 1963, *Goddard* (BRI 42938); near Hyland State Forest, 1375 m. alt., 5 Apr. 1955, *Turner* (NSW 44058); Orara West State Forest, E. Dorrigo, May 1946, *W. T. Jones* 5 (BRI 42305–6); Bellangry State Forest, about 20 miles NW. of Wauchope, 2 Jan. 1957, *Cousins* 180 (NSW 44059); Comboyne, Jan. 1934, *Chisholme* (NSW



MAP 3. Distribution of *Notelaea venosa*, *N. punctata* and *N. microcarpa*.

44060) & *Fraser* (NSW 44061); The Corker, Upper Williams River to Barrington Tops, 26 May 1934, *Fraser 19* (NSW 44062).

When studying the material of this species, certain specimens with subcordate leaf bases and very short petioles (1.5–3 mm. long) came to be put on one side as constituting a distinct entity. This seemed more probable when it was noted that one or two came from relatively high altitudes and that when their distribution was plotted on a map they were found only amongst the northernmost specimens (see MAP 3). However, with the limited material available there seem to be no other distinguishing characters and one of the southernmost specimens, *Miss L. Fraser* from Comboyne (NSW 44061), exhibits both types of leaf, in this case with the unusual short-stalked leaves together with inflorescences on the youngest shoots, and the typical leaves towards the base. Also, a specimen at Kew collected by Charles Fraser during the last century from about the same area, "native of the banks of the River Hastings," bears leaves somewhat intermediate in leaf base and petiole length (6–8 mm.). A comment, written upon another sheet, suggests that the unusual leaves are juvenile, but several of the specimens exhibiting them bear young fruit or the remains of flowers, while other undoubtedly juvenile collections bear leaves with typical bases and petioles, while a seedling collected on Mt. Drummer (BRI 34850), although with short petioles, has the typical acute leaf base. Further collections and field observations from the populations in north-west New South Wales and southernmost Queensland are desirable and may prove that they do merit nomenclatural differentiation after all.

4. *Notelaea punctata* R. Brown, Prodr. 524. 1810; Sprengel, Syst. Veg. 1: 35. 1824; A. DC. in DC. Prodr. 8: 291. 1844; Reichenb. f. Neuholl. Pfl. Amelia Dietrich 9. 1866; Bentham, Fl. Austral. 4: 300. 1868; F. Mueller, Syst. Census Austral. Pl. 92. 1882; F. M. Bailey, Synop. Queensl. Fl. 303. 1883; F. Mueller, Second Syst. Census Austral. Pl. 156. 1889; F. M. Bailey, Cat. Pl. Queensl. 29. 1890; C. Moore, Handb. Fl. New S. Wales, 320. 1893; F. M. Bailey, Queensl. Fl. 3: 973. 1900; Dixon, Pl. New S. Wales 214. 1906; F. M. Bailey, Comprehensive Cat. Queensl. Pl. 311. 1913; Domin, Bibliot. Bot. 22(89) (Beitr. Fl. Pflanzengeogr. Austral. 1(3): 514): 1068. 1929; Bean in Chittenden, Dict. Gard. 3: 1379. 1951.

Bushy *shrub* to 1(–2) m. high (? more), branches glabrous or very minutely puberulous when young. *Leaves* glabrous; petiole 2–6(–10) mm. long, glabrous; lamina thickish, punctate above and below, especially below, narrowly ovate to lanceolate or elliptic to narrowly elliptic, (3.5–) 5–9(–13) cm. long by (1–)1.5–3(–5) cm. broad; margin entire or occasionally slightly, very shallowly and irregularly crenulate, slightly thickened; apex acute or very slightly acuminate, tip acute; base acute or cuneate (rarely obtuse and rounded), attenuate or somewhat decurrent onto the petiole; venation raised and clearly reticulate above, usually

less clearly so below, often obscure or visible as lighter lines or only slightly raised, 6–8(–10) primary veins per side. *Inflorescence* axillary, often up to 3 mm. above the axil with 1–2 dormant buds in between, 1(–2) per axil, decussate, (1–)1.5–3 cm. long, (7–)9–13-flowered, glabrous, except occasionally for a few minute scattered hairs towards the base; upper bracts 1–1.5 mm. long, thin, lanceolate to ovate, acute, early deciduous, ciliolate, basal pair thick, 1–2 mm. long, acute or acuminate, glabrous or with a few minute hairs towards the apex, persistent or at least the fused bases persistent. *Flowers* hermaphrodite, creamy white or pale yellow; pedicels 2–5(–8) mm. long. *Calyx* 0.5–1 mm. long, lobes 4, broadly and irregularly triangular, 0.3–0.6 mm. long, glabrous or ciliolate, sometimes subapiculate. *Corolla* induplicate-valvate, lobes 4, 2–3 mm. long, concave, joined in pairs above the base of the filaments for about 0.4 mm. *Stamens* 2, broadly ellipsoid, 1.5–2.5 mm. long, more or less enclosed within the concave petals, filaments 0.3–0.5 mm. long, with a terminal appendage about 0.1–0.3 mm. long, dehiscence lateral. *Ovary* 1–1.5 mm. long with 2 stigmatic lobes 0.2–0.3 mm. long on a short style about 0.2 mm. long. *Drupe* varicolored (fide *McLaughlin 22C*), pale (fide note with *Biddulph 63*), ovoid, 7–9 mm. long by 5–6 mm. broad; endocarp hard, 0.2 mm. thick.

Queensland. COOK DISTRICT: Middle Creek, about 6 miles SE. of Cairns, 30 Oct. 1949, *Flecker* in *N. Queensland Nat. Club 13331* (BRI 42304). NORTH KENNEDY DISTRICT: SE. slopes of Gt. Dividing Range, about 4 miles NNE. of Herberton, about 1060 m. alt., 7 Aug. 1948, *L. S. Smith 3729* (BRI 42313) & about 6 miles NNE. of Herberton, about 1100 m. alt., 26 Aug. 1954, *Smith 5301* (BRI 42302 & 42303); Herberton, 1918, *Michael 624* (BRI 7911); W. of Herberton, crest of Gt. Dividing Range, 1050 m. alt., 22 Aug. 1963, *Blake 22107* (BRI 42318); Rockingham Bay, *Dallachy* (BM, K, LE, NSW 44056). PORT CURTIS DISTRICT: Shoalwater Bay, 1802, *R. Brown "2846"* (BM, holotype; E, K. MEL 19631 isotypes). LEICHHARDT DISTRICT: Blackdown, about 12 miles SSE. of Bluff, Aug. 1961, *Gittins 389* (BRI 30808); Aug. 1964, *Gittins 887* (BRI 56856) & 887/2 (BRI 56855); Blackdown Tableland, south of Dingo, Sept. 1937, *Simmons* (BRI 7917); Rockland Spring, 30 miles ENE. of Springsure Township, 5 Sept. 1961, *Lazarides & Story 121* (CANB 111988, K, NSW 67495); Expedition Range, Aug. 1960, *Gittins 360* (BRI 25421); Mt. Playfair, Springsure district, Sept. 1935, *McLaughlin 22c* (BRI 7914) & Nov. 1959, *Biddulph 63* (BRI 27107); 21 miles SE. of Bedourie, 14 Oct. 1963, *Speck 1858* (BRI 59772, CANB 137885, K); Isla Gorge between Theodore and Taroom, 1 Sept. 1963, *Hockings* (BRI 42317); 16 miles SSW. of Cracow Township, 10 July 1963, *Lazarides 6950* (BRI 51428–9, CANB 123629). BURNETT DISTRICT: Eidsvold, 1919, *Bancroft* (BRI 9700). WIDE BAY DISTRICT: Fraser Island, 6 Sept. 1916 & Dec. 1918, *Petrie 32* (BRI 9698 & 7927) & Oct. 1921, *White* (BRI 7936); Cootharaba, Dec. 1917, *Francis* (A, BRI 7932); Imbil, 27 March 1918, *Weatherhead* (BRI 9697, K).

Although in its typical state, with an obscure venation on the undersurface of the leaf and small fruits, *Notelaea punctata* is easily distinguished from typical *N. longifolia* (in which the leaves are clearly reticulate below with raised veins and the fruits are larger), the two species tend to merge where their areas of distribution meet (MAPS 1 & 3). The

dotting of the leaf, so abundant and obvious on the type, and thus taken by Robert Brown as the basis for his specific epithet, is also found in *N. longifolia* (and other species) but usually much less obviously and abundantly so. Using leaf characters alone, it appears that there may be an area of transition, but too few specimens are in fruit and none from the intermediate areas. More collecting and further field observations are badly needed, especially in the Burnett and Wide Bay Districts of Queensland. This species is insufficiently well known and it may turn out that it would be better treated as a subspecies of *N. longifolia*.

C. Moore in his Handbook of the Flora of New South Wales of 1893 (p. 320), records *Notelaea punctata* from the northern coast district of New South Wales, but this is clearly an error and must have been based on a misidentification.

In habit *Notelaea punctata* would seem, from the limited field notes available, to resemble *N. ovata*, usually growing as a low shrub, with many erect branches, from a rootstock which presumably survives bushfires. The only notes giving details of habitat indicate that *N. punctata* is found under *Eucalyptus* spp. on sandy soils on sandstone plateaux and ranges.

5. *Notelaea microcarpa* R. Brown, Prodr. 524. 1810; Sprengel, Syst. Veg. 1: 35. 1824; A. DC. in DC. Prodr. 8: 291. 1844; Bentham, Fl. Austral. 4: 300. 1868; F. Mueller, Fragm. Phytogr. Austral. 8: 43. 1873, & Syst. Census Austral. Pl. 92. 1882; Bailey, Synop. Queensl. Fl. 303. 1883, & Queensl. Woods 89. 1888 & 97. 1889; F. Mueller, Second Census Austral. Pl. 156. 1889; Maiden, Useful Native Pl. Austral. 580. 1889; C. Moore, Handb. Fl. New S. Wales 320. 1893; F. M. Bailey, Cat. Pl. Queensl. 29. 1890, & Queensl. Fl. 3: 973. 1900; Dixon, Pl. New S. Wales 214. 1906; Guilfoyle, Austral. Pl. 100. [1911]; F. M. Bailey, Comprehensive Cat. Queensl. Pl. 311. 1913; Maiden & Betche, Census New S. Wales Pl. 172. 1916; Domin, Bibliot. Bot 22(89) (Beitr. Fl. Pflanzengeogr. Austral. 1(3): 514): 1068. 1929; Anderson, Trees New S. Wales, ed. 2. 69, 132, 338. 1947; M. Gray, Contr. New S. Wales Natl. Herb. 3: 59. 1961.

Evergreen shrub or small tree to 10 m., usually round headed; bark gray, tessellated; branches puberulous when young, sometimes only minutely so. Leaves glabrous or scattered puberulous above and below, becoming glabrous, except occasionally near the midrib, or densely velutinous, especially below; petiole (1-)2-5(-10) mm. long, glabrous or puberulous, becoming glabrous; lamina thickish, scattered punctate, (lanceolate-) narrowly or very narrowly lanceolate (-linear), (2-)3-8(-15) cm. long by (0.3)0.5-1.5(-3) cm. broad; margin entire, scarcely thickened or occasionally somewhat thickened, usually flat; apex acute or obtuse-apiculate; base very narrowly cuneate, decurrent onto the petiole; venation usually raised and reticulate, especially above, less so, and sometimes almost obscure, below, 5-7 primary veins per side making an angle of about 15°-30° with the midrib and eventually running almost parallel to the margin.

Inflorescence axillary, 1–2 per axil, decussate (rarely and freakishly, terminal and then perhaps thyrsoid), 0.5–2 cm. long, (7–)9–13(–15)-flowered or rarely (more or less freakishly?) paniculate and many flowered (NSW 33512 & 33606), puberulous, especially towards the base, to remotely scattered puberulous, rarely almost glabrous with a few hairs towards the base; upper bracts 1.5–2 mm. long, thin, more or less ovate or lanceolate, early deciduous, ciliolate, basal pair thick, their joined bases persistent, puberulous, rarely glabrous (in northernmost specimens), 1–1.5 mm. long, acute. *Flowers* hermaphrodite, greenish-yellow, yellow or cream; pedicels 0.5–4(–6) mm. long. *Calyx* 0.3–0.6 mm. long, lobes 4, usually with 2 long and 2 short (the longer at the base of the corolla pair), irregularly triangular, 0.1–0.5 mm. long, glabrous or margin bearing a few hairs. *Corolla* induplicate-valvate, lobes 4, 1.4–2 mm. long, concave, joined in pairs above base of filament for about 0.7–0.8 mm. Stamens 2, ellipsoid, (0.8–)1–1.5 mm. long, more or less enclosed within the concave petals, subsessile or on filaments 0.1–0.2 mm. long, with blunt terminal appendage about 0.1–0.2 mm. long, lateral dehiscence. *Ovary* 1–1.5 mm. long, with 2 stigmatic lobes 0.2–0.3 mm. long on short style about 0.2 mm. long. *Drupe* dark blue or blackish (becoming soft and purple when ripe, *vide* Johnson), ovoid, (5–)7–10 mm. long by (4–)5–8 mm. broad (smallest dimensions immature?); endocarp hard, 0.2–0.4 mm. thick.

Var. *microcarpa*

Leaves glabrous or with only scattered pubescence above and below.

SELECTED EXSICCATAE: Queensland. COOK DISTRICT: Stannery Hills, Apr. 1909, *Bancroft* (BRI 8272, K) & Dec. 1908, *Bancroft* 259 (BRI 8250, K); Lynd Scrub, approx. 40 miles SW. to SSW. of Mt. Garnet, 24 Aug. 1949, *L. S. Smith* 3859 & 3869 (BRI 42307–8). NORTH KENNEDY DISTRICT: St. Roman's Station, Mt. Garnet, 29 Apr. 1960, *Myers* (BRI 28627); Dickson Hill, Mt. Fox, 27 Sept. 1949, *Clemens* (K); Dalrymple Road, 12 miles N. of Charters Towers, *Flecker* (*Rodway* 7933) (NSW 33422). SOUTH KENNEDY DISTRICT: 3 miles W. of "Collin Downs" Station, 11 Aug. 1964, *Adams* 1261 (CANB 143194, K). PORT CURTIS DISTRICT: Sarina (Lotus Creek), 29 Sept. 1962, *Jones* 2245 (CANB 136113); Broad Sound, 1803, *R. Brown* (BM, holotype; E, K, LE, NSW 33569, P, isotypes); Many Peaks, Shoalwater Bay, July 1919, *McEniery* (BRI 9695); Rockhampton, *Bailey* 68 (BRI 8271, K), *Dallachy* (BM) & *ex F. Mueller* (GH, LE); Scubby Creek, near Rockhampton, July 1937, *Simmons* (A, BRI 8269 & 8270, K); Biloela, about 175 m. alt., 25 Oct. 1947, *L. S. Smith* 3552 (BRI 42310–1). LEICHHARDT DISTRICT: Croyden Station, 2 Nov. 1962, *Jones* 2319 (CANB 136039); Gindie, Aug. 1916, *White* (BRI 8262, K, NSW 33571); Dawson, *Bancroft* 56 (BRI 8275). MITCHELL DISTRICT: Enniskillen, 14 Nov. 1943, *White* 12371 (A, BRI 8281); Victoria River, 17 Sept. 1846, *Mitchell* 310 (BM). WARREGO DISTRICT: Warrego, *Bailey* 55 (BRI 8253); Morven, 17 Apr. 1961, *Jones* 1928 (CANB 107495). MARANOA DISTRICT: 17 miles E. of Morven, 9 June 1937, *Everist* 1525 (BRI 8283); 20 miles W. of Mitchell, 500 m. alt., 31 March 1936, *Blake* 10935 (BRI 8257 & 8261, CANB 38903, K); Orallo, Oct. 1920, *Dunlop* (BRI 8274, K, NSW 33572); Roma, July 1915, *Bick* (BRI 8267, K, NSW 33574) & 25 Oct. 1933, *White* 9510 (A, BRI 8255); Honeyamah, about 40 miles SE. of Bollon, 16

July 1948, *Everist* 3478 (BRI 8273, CANB 25566, K). BURNETT DISTRICT: Eidsvold, *Bancroft* (BRI 8278, K); Mt. Perry, *Keys* 269 (BRI 9696); Dallarnil, 28 Dec. 1939, *L. S. Smith* 665 (A, BRI 9699); Haley Creek Road, 21 Oct. 1947, *Mitchell* 3050 (BRI 7915). WIDE BAY DISTRICT: Theebine, Nov. 1921, *White* (A, BRI 8265, K); Wide Bay, 1854, *Moore* (K). MORETON DISTRICT: Forestry Reservation, Yarraman, approx. 400 m. alt., Aug. 1944, *Clemens* (A, BRI 42312); Laidly Hills, 25 Jan. 1944, *Clemens* 43476a (A); Pine Mountain, N. of Ipswich, Oct. 1946, *Everist* (BRI 9575, K); 1 mile N. of Boonah, on Kalbar Road, 24 Nov. 1946, *Everist & Webb* 1415 (BRI 9715, CANB 16733, K); mouth of Coomera R., 21 Jan. 1927, *White* 3381 (A, BRI 7912, K). DARLING DOWNS DISTRICT: Glenmorgan, 19 July 1949, *Gordon* 63 (BRI 42316); 2 miles W. of Condamine, 24 Aug. 1956, *Everist* 5795 (BRI, CANB 100241, K); N. of Miles, 14 Aug. 1951, *Webb* 1500 (CANB 30648); Chinchilla, 8 July 1912, *Bensley* 1 (BRI 8258, K); Warwick, Aug. 1913, *Shirley* (BRI 8254, K, NSW 33575); Silverwood, Sept. 1922, *White* 1763 (A, BRI 18276, K, NSW 33576).

New South Wales. 20 miles N. of Torrington, 12 Dec. 1951, *Jessup & Gray* 23 (CANB 126269, NSW 42868); Mt. Mitchell, near Warialda, 28 July 1922, *de Beuzeville* 12 (NSW 33580); Wallangra, Sept. 1929, *Rodway* 6225 (K, NSW 33421); Moree, 29 Sept. 1912, *Brennan* (NSW 33582); Narrabri West, Aug. 1907, *Boorman* (GH, NSW 33590, z); Warrumbungle Mountains, 640 m. alt., 26 May 1948, *Constable* (BM, K, NSW 6475); Little Sugar Loaf Mountain, near Gunnedah, 352 m. alt., 1 Nov. 1954, *Johnson & Constable* (K, NSW 32028); "Lowestoft," 27 miles S. of Tamworth, near highway, 684 m. alt., 18 Apr. 1956, *Constable* 1658 (A, K, NSW 37333); Wellington, 20 Oct. 1880, *Betche* (NSW 33592); "Merrot," Curriecabark, 30 miles NW. of Barrington, Feb. 1949, *Hyem* (NSW 33594); 6 miles SW. of Scone, 16 March 1960, *Story* 7071 (CANB 80160, K); Mt. Wambo, 5 miles NW. of Bulga, 600 m. alt., 30 Aug. 1957, *Constable* (NSW 42865).

Cultivated. Botanic Gardens, Brisbane, 31 Oct. 1930, *Hubbard* 4740 (A, K) & 8 Nov. 1963, *Green* 1530 (A).

Notelaea microcarpa is one of the two most widespread species in this genus (MAP 3). To judge from its distribution, and from the annotations on the herbarium covers at Sydney, it is characteristic of an area of moderately dry, distinctly continental climate with a summer maximum rainfall. It is an "inland" species of the "western slopes country" and although it approaches the coast in parts of Queensland, e.g. around Rockhampton, it does so in comparatively dry areas. At its southern limit it stops "at the Wellington-Hunter Valley latitude, i.e. where the summer rainfall zone begins to pass into the transitional zone."

At its southern limit the distribution of *Notelaea microcarpa* approaches most closely to *N. neglecta*, perhaps the most nearly related species, and the one under which their differences and affinities are discussed. *N. neglecta* is found to the south and east with a damper and often cooler climate.

Notelaea microcarpa, as its name suggests, is characterized by small fruits, a character it shares with *N. neglecta* and *N. linearis*, both of which have narrow leaves. From *N. longifolia* it may be distinguished by the relative obscurity of the veins on the underside of the leaf (reticulate in *N. longifolia*) and also by the narrow angle at which the primary veins

join the midrib, approximately 15° – 30° in *N. microcarpa* and 40° – 70° in *N. longifolia*.

However, exceptionally narrow leaves may occur rarely on adult plants, for example, a specimen from Sarina (Port Curtis District) Queensland (CANB 136113) exhibits linear leaves, (3–)4.5–7(–9) cm. long by (0.25–)0.35–0.6(–0.8) cm. broad; the notes on the label say "very narrow leaf form, extreme dry conditions." The venation is obscure as well and it might easily be mistaken for *N. neglecta* were it not from far outside the geographical range of that species.

Using herbarium material alone it is very difficult to evaluate juvenile characters but it is suspected that four herbarium sheets bearing specimens with much larger leaves than usual were gathered from juvenile plants. Three of these are from the Yarraman Forestry Reservation, Moreton District, Queensland, Aug. 1944, coll. *M. S. Clemens* (A). Two sheets have notably juvenile, long narrow leaves 10–27 cm. long and 0.3–1.2 cm. broad exhibiting up to about 20 primary veins on each side of the midrib. The third sheet, annotated as a slender sapling, is in flower and has broader leaves than usual, up to 11 cm. long and 3.5 cm. broad. The fourth, from St. Roman's Station, Mt. Garnet, N. Kennedy District of Queensland, has leaves 20 cm. long and 2 cm. wide. Large juvenile foliage is similarly found in *Notelaea longifolia* and *N. ovata* and particularly in the more distantly related New Zealand species of *Nestegis*.

Notelaea microcarpa is believed to hybridize with both *N. longifolia* and *N. ovata* and more detailed mention of this has been made under these species.

Var. *velutina* (F. M. Bailey) P. S. Green, comb. nov.

N. longifolia Vent. var. *velutina* F. M. Bailey, Comprehensive Cat. Queensl. Pl. 311, 319 & 839. fig. 293. 1913; White, Queensl. Agric. Jour. II. 22: 241. pl. 77, 78. 1924 & op. cit. 23: 435, 436. pls. 80, 81. 1925; Domin, Bibliot. Bot. 22(89) (Beitr. Fl. Pflanzengeogr. Austral. 1(3): 514): 1068. 1929.

Leaves densely velutinous, especially on the undersurface.

Queensland. DARLING DOWNS DISTRICT: Silverwood, Sept. 1922, *White* 1764 (A, BRI 7941, K, NSW 33530); Killarney, *Bailey* (? *Wedd*) (BRI 9358, holotype; K, isotype); Wilson's Peak, *Michael* 1983 p.p. (NSW 33532); Stanthorpe, July 1904, *Boorman* (NSW 33531), about 1000 m. alt., June 1924, *Tryon* (BRI 7942, K) & *Perkins* (BRI 7943, K); Eabey, via Stanthorpe, Nov. 1944, *Clemens* (BRI 7923); Granite National Park, Wyberba, Nov. 1944, *Clemens* 44738 (K).

New South Wales. Macpherson Range, May 1907, *Dunn* 335 (NSW 33533); Rivertree, 5 Sept. 1911, *Cabbage* 2852 (NSW 33534); head of Wylie Gorge, Liston, 17 Nov. 1943, *Clemens* (A); Nymboida River, near Dorrigo, 5 Nov. 1963, *Green* 1519 a, c, e, g, & j–l (A); Bald Nobbs, Armidale, 28 Sept. 1912, *Stopford* 45 (BM); Castle Doyle Road, about 7 miles SE. of Armidale, Feb. 1928, *McKie* 93 (NSW 33536); Wollomombi, 4 March 1933, *McKie* (NSW 33537); Apsley Falls, about 900 m. alt., 25 May 1957, *Johnson* (NSW 46142); Tia Falls (E. of Walcha), Dec. 1898, *Betche* (NSW 33538) & Oct. 1900, *Forsyth & Cheel* (NSW 33539).

Although this variety was attributed by F. M. Bailey to *Notelaea longifolia*, it really belongs to *N. microcarpa*. Most specimens are in flower or immature fruit but the collection from Stanthorpe, Queensland, by F. A. Perkins in June 1924 has mature fruits of the typical small size, 8–9 mm. long by 7–8 mm. broad. Furthermore, the angle the primary veins make with the midrib of the leaf, the relative obscurity of the veins beneath (although this is masked by the velutinous covering), the general proportions of the leaf and the length of the individual inflorescences, all indicate *N. microcarpa*. Velutinous forms of *N. longifolia* exist but are found in the southern parts of range for that species, so that all *N. longifolia* in the northern areas of New South Wales or in Queensland are glabrous, or, at the most, glabrate. *Cabbage 2702* from the central tablelands region of N.S.W. (from Baerami to Denman, 15 May 1911, NSW 33540) was examined carefully because of its narrow and velutinous foliage and it is believed that it represents the result of hybridization between this species and *N. longifolia* f. *longifolia*.

The distribution of this variety is restricted to the southeastern part of the Darling Downs district of Queensland and the Northern Tablelands of New South Wales. I have seen material from the northernmost areas of New South Wales and again in the southern parts of the New England Ranges but it may well occur in between.

Typical *Notelaea microcarpa* occurs near at hand in parts of the variety's range, e.g. *White 1763* from Silverwood, Queensland, which was presumably collected near to *White 1764* a specimen of the densely velutinous variety, while collections with slight pubescence are found scattered throughout the range of the species. In November 1963 I was fortunate to be taken to a population of *Notelaea* near Dorrigo through the kindness of Alex G. Floyd and Harold C. Hayes, and there took samples from 12 bushes and small trees scattered over a small area near the Nymboida River (*P. S. Green 1519 a-l*). At the time I was struck by the variation in the breadth and pubescence of the leaves, but it is now apparent to me that this variation is due to introgression which has occurred between *N. longifolia* and *N. microcarpa* var. *velutina*. The area, like much of that part of New South Wales, is one where considerable felling has taken place and the velutinous upland plant may well have come into contact with the more lowland *N. longifolia* due to man's activities. In the citation of the population sample I have placed those parts which seem nearer to *N. microcarpa* var. *velutina* above and those nearer to *N. longifolia* under that species. *Turner 29*, cited under *N. longifolia*, from Paddys Land State Forest, a little distance to the northwest, also shows intermediate characteristics and some of the gatherings cited above as var. *velutina* possess leaves which are slightly wider in proportion to their length than is usual for the species, and may perhaps show the influence of *N. longifolia*, for example the Clemens collection from the head of Wylie Gorge, Liston, New South Wales.

6. *Notelaea linearis* Bentham, Fl. Austral. 4: 300. 1868; F. Mueller,

Syst. Census Austral. Pl. 92. 1882; F. M. Bailey, Synop. Queensl. Fl. 303. 1883 & Cat. Queensl. Fl. 29. 1890; C. Moore, Handb. Fl. New S. Wales, 321. 1893; F. M. Bailey, Queensl. Fl. 3: 973. 1900; Dixon, Pl. New S. Wales 215. 1906; F. M. Bailey, Comprehensive Cat. Queensl. Pl. 311. 1913; Maiden & Betche, Census of New S. Wales Pl. 172. 1916; Anderson, Trees New S. Wales ed. 2. 132. 1947; M. Gray, Contr. New S. Wales Natl. Herb. 3: 59. 1961.

Evergreen shrub 1–2 m. high, branches glabrous or minutely puberulous at first, soon glabrous. *Leaves* glabrous; petiole 1–3(–4) mm. long, glabrous or minutely puberulous above when young; lamina thick, linear or occasionally very narrowly lanceolate or elliptic (? juvenile condition), (2–)3–6(–11.5) cm. long by (0.15–)0.2–0.5(–0.7) cm. broad (? up to 1 cm. broad in juvenile state), punctate, especially below, margin entire, somewhat thickened; apex very acute; base narrowly attenuate into the petiole; venation completely obscure above and below, or rarely (? juvenile state) with primary veins just visible above and below, about 7 per side joining to form a submarginal nerve. *Inflorescence* axillary, 1 per axil, decussate or subumbellate, 0.4–1 cm. long, (3–)5(–7)-flowered, glabrous or puberulous, often only very slightly so; upper bracts 0.5–1 mm. long, thin, triangular-ovate, early deciduous, basal pair thick, persistent, glabrous or puberulous-ciliolate, 1 mm. long, acute. *Flowers* hermaphrodite (FIG. 2), pale yellow (*vide* White & Williams); pedicels 1–4 mm. long. *Calyx* 0.5–0.7(–1) mm. long, lobes 4, irregularly triangular, 0.2–0.5 mm. long, glabrous, margins sometimes slightly ciliolate. *Corolla* induplicate-valvate, lobes 4, (1.5–)2 mm. long, concave, in pairs, joined above the base of filaments for 0.3–0.6 mm. *Stamens* 2, (1–)1.5 mm. long, more or less enclosed within the concave petals, on filaments 0.2–0.3 mm. long with a broad connective and well developed blunt terminal appendage 0.2–0.3 mm. long. *Ovary* 1–1.4 mm. long with 2 stigmatic lobes 0.2–0.4 mm. long on style 0.2 mm. long. *Drupe* ovoid, 5–7 mm. long by 4–5 mm.

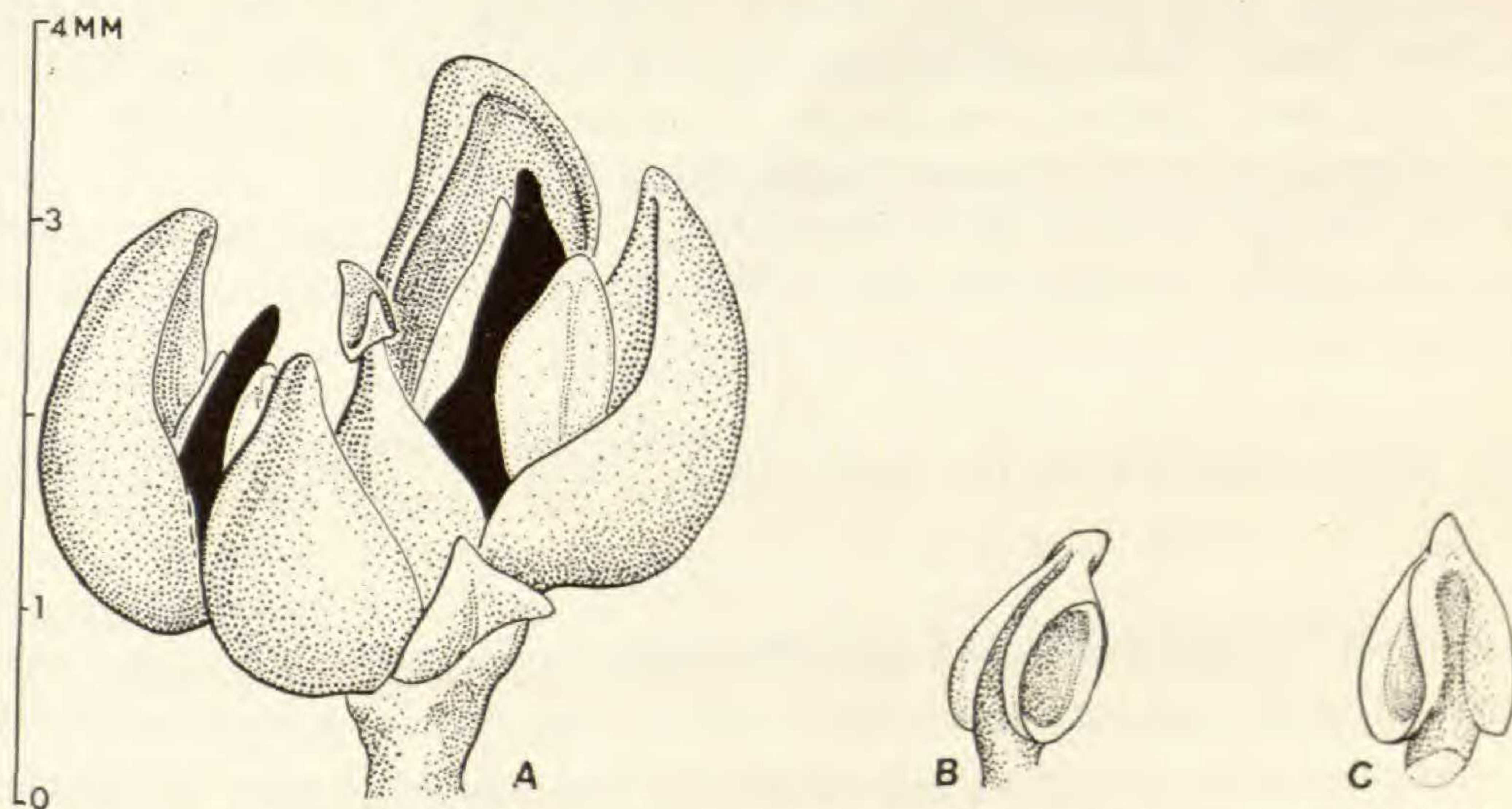


FIG. 2. *Notelaea linearis*. A, flower; B & C, stamen. (Drawn from Hubbard 3961).

broad, "white and translucent" (*vide* Galbraith, BRI 49151) and "rich blue with a thin bloom" (*vide* Galbraith, BRI 49152); endocarp hard, 0.2 mm. thick.

Queensland. MORETON DISTRICT: Crow's Nest, Sept. 1920, *Kenny* (BRI 7904), Oct. 1921, *White* (A, NSW 33423); Pearson's Falls, Helidon, *Bailey* (BRI 7905, K). DARLING DOWNS DISTRICT: Thulimbah, *Schindler 3* (BRI 7901); *Messines*, near Stanthorpe, approx. 900 m. alt., 13 Sept. 1930, *Hubbard 3961* (BRI 7906, K); Stanthorpe, *Bailey* (BRI 7903) & July 1904, *Boorman* (NSW 33424); Glen Aplin, 9 Sept. 1933, *White 9253* (A, BRI 7902); Wyberba, Feb. 1964, *Galbraith* (BRI 49151-2); Wallangarra, Nov. 1904 & Jan. 1906, *Boorman* (NSW 33427 & 33428).

New South Wales. Wallangarra area, 16 March 1954, *Jessup & Gray 2554* (CANB 126268); Richmond River, *Beckler (z)*; Wilson's Downfall, 3 Sept. 1911, *Cabbage 2809* (NSW 33425); Boonoo Boonoo, Nov. 1904, *Boorman* (NSW 33426); Jennings, Oct. 1901, *Boorman* (NSW 33429); near Tenterfield, *Stuart* (K, syntype); Torrington, Oct. 1911, *Boorman* (NSW 33431); Bismuth, via Deepwater, Aug. 1913, *McNutt* (NSW 33430); Gibraltar Range, NE. of Glen Innes, Apr. 1958, *Williams* (NSW 44089); 27 miles E. of Glen Innes, 1000 m. alt., 4 Oct. 1958, *Williams 625* (NSW 46450); Mount Mitchell, *Beckler* (K, lectotype); top of range near Backwater, 30 Oct. 1929, *Blakely, McKie & Youman* (NSW 33432). Without locality: New England, *F. Mueller* (BM).

Apart from *Notelaea neglecta*, described below, *N. linearis* can be distinguished at a glance from all other species in the genus by its extremely narrow leaves. In juvenile plants it is suspected that they are a little broader perhaps, but one cannot be certain without adequate observations based on living plants. In *N. neglecta* the leaves are a little broader but the two species differ from one another not only by their leaf venation, which is obscure in *N. linearis*, but in the inflorescence length, which is longer in *N. neglecta* (in fact the inflorescence is shorter than in any other species except possibly some representatives of *N. microcarpa*). *N. linearis* is found on siliceous soils in eucalypt forest and is ecologically distinct from *N. neglecta*. *N. linearis* is confined to an area in northern New South Wales and southernmost Queensland, with *N. neglecta* in an even more limited area about 250 miles further south in the Blue Mountains in central New South Wales (MAP 2).

From the type material in the Kew Herbarium I have selected the specimen collected by Beckler and sent to Kew by von Mueller in 1868 as the lectotype because it exhibits both flowers and fruit, whereas the other collection cited in the protologue, the Stuart specimen from near Tenterfield, whilst mounted on the same sheet, bears only one or two young flower buds.

7. *Notelaea neglecta* P. S. Green, sp. nov.

Species foliis angustis (2.5-)4-7(-11) cm. longis, (0.2-)0.3-0.8(-1.4) cm. latis, venatione obscura sed manifesta, inflorescentiis 1-2 cm. longis, drupis parvis 5-6 mm. \times 4-5 mm. distincta. A *N. lineari* foliis plerumque longioribus et latioribus, inflorescentiis longioribus (10-20 mm. longis)

differt. A *N. microcarpa* foliis angustis, venatione minore prominente, venis primariis sub angulo circiter 40° e nervo mediano exortis, inflorescentiis glabris differt.

Evergreen, probably a shrub; stem minutely puberulous when young, sometimes becoming glabrous. *Leaves* thickish, glabrous, or minutely puberulous above and below at first when young, finely punctate; petiole 1–5(–8) mm. long, minutely puberulent, especially above, often becoming glabrous; lamina very narrowly elliptic or narrowly lanceolate to linear, (2.5–)4–7(–11) cm. long by (0.2–)0.3–0.8(–1.4) cm. broad; margin entire, somewhat thickened; apex elongated, very acute; base acute, long attenuate into the petiole; venation more or less obscure except for the slightly visible primary veins, especially above, often not visible below, (6–)7–10(–11) per side, making an angle of about 40° with the midrib. *Inflorescence* axillary, 1–2 per axil, decussate, glabrous; 1–2 cm. long, (3–)7–9-flowered; upper bracts early deciduous, broadly ovate to lanceolate, pointed, 1–2 mm. long, somewhat puberulent, especially towards the tip; basal bracts thickish, 1–2 mm. long, acute or acuminate, puberulent, fused bases persistent. *Flowers* hermaphrodite, yellow (?); pedicels (1–)3–5 mm. long. *Calyx* 0.5–1 mm. long with 4 irregularly triangular, more or less erose lobes, 0.3–0.6 mm. long. *Corolla* induplicate-valvate, 1.5–2.25 mm. long, 4 lobes joined in pairs at the filament 0.3–0.5 mm. from their base, concave. *Stamens* 2, 1.25–1.5 mm. long, included within the concave corolla lobes; filament short and broad, 0.2 mm. long. *Ovary* flask-shaped, 1–1.5 mm. long, tapering into an imperceptible style with a bifid stigma 0.2 mm. long. *Drupe* ovoid, globular, 5–6 mm. long by 4–5 mm. broad (NSW 33635).

New South Wales. Capertee, Sept. 1915, *Boorman* (NSW 33618); Jenolan Caves, Sept. 1899, *Blakely* (NSW 33620, holotype; A, K, & NSW 33621, isotypes), 5 Sept. 1923, *Cheel* (NSW 33623), 29 Oct. 1940, *Blakely & Ludowici* (A, K, NSW 33619); Colong-Yerranderie, 5 Oct. 1909, *Cabbage* 2268 (NSW 33624); Wombeyan Caves, Oct. 1905, *Maiden* (A, BRI 8263, K, NSW 33629–31), 1 Oct. 1905, *Cabbage* 1345 (NSW 33632); Bullio to Wombeyan, Oct. 1905, *Maiden* (NSW 33628); Bowral to Wombeyan, 30 Sept. 1905, *Cabbage* 1330 (CANB 7610, NSW 33627); Mittagong to Bullio, 28 Nov. 1919, *Cheel* (NSW 33625); Berrima, July 1906, *Boorman* (NSW 33626); Devil's Hole, Tallong, Oct. 1917, *Rumsey* (NSW 33636); Wingello-Tallong, Oct. 1938, *Murphy* (NSW 33633); Tallong (Barber's Creek), Dec. 1897, *Maiden* (NSW 33635), Oct. 1899, *Rumsey* (NSW 33634).

The epithet chosen for this species is intended to reflect the fact that it has been overlooked for many years. L. A. S. Johnson had already recognized it as distinct and segregated the material in the Sydney Herbarium, before it was sent on loan, and I am greatly indebted to him for his helpful notes.

To judge from the names already on the herbarium sheets, this species has previously been confused with *Notelaea linearis* and *N. microcarpa*, presumably because of the general characters of the leaf, which lie roughly between the two. The typical leaf is neither as narrow as that of *N. linearis* nor as broad as that of *N. microcarpa*. The venation is somewhat

intermediate as well, more distinct than that in the former and more obscure than the latter. All three are small fruited and undoubtedly closely allied but, although it is possible that they arose from a common stock, or that at some stage *N. neglecta* developed as a stabilized hybrid between the other two, they are distinct today.

Geographically each has its own area of distribution and, to judge from field notes, their edaphic and climatic adaptations are different. *Notelaea neglecta* grows on limestone, and possibly a variety of rocks, but never on the most siliceous. *N. linearis*, on the other hand, is a species of siliceous soils, including "acid granite." *N. microcarpa* occurs on a variety of rocks and, like *N. neglecta*, never on the most highly siliceous, but climatically it is restricted to the "western slopes country" although, at its southern limit, the two species approach one another (MAPS 2 & 3).

Notelaea sect. Ligustrina P. S. Green, sect. nov.

A sectione *Notelaea* corollae aestivatione imbricata differt. Flores parvi, hermaphroditi; corollae lobi 4, leviter imbricati, per paria connati vel ope baseos filamenti conjuncti; corollae tubus perbrevis vel nullus. Drupa parva, vel nigra vel purpurea vel rubra vel rosea vel alba.

TYPE SPECIES: *Notelaea ligustrina* Vent.

The separation of this section and the relationships of its single and type species, *Notelaea ligustrina*, are discussed below under that species.

8. *Notelaea ligustrina* Ventenat, Choix de Pl. sub *t.*25. 1804; R. Brown, Prodr. 524. 1810; Sprengel, Syst. Veg. 1: 35. 1824; Loudon, Arb. Frut. Brit. 4: 2579. 1838; A. DC. in DC. Prodr. 8: 291. 1844; Hooker f. Fl. Tasman. 1: 268. 1857; Meredith, Bush Friends Tasman. *t.*2. 1860; F. Mueller, Pl. Colony Vict. Lithograms, *t.*54. 1864-65; Bentham, Fl. Austral. 4: 300. 1868; F. Mueller, Fragm. Phytogr. Austral. 8: 43. 1873 & 142. 1874; Spicer, Handb. Pl. Tasman. 125. 1878; F. Mueller, Syst. Census Austral. Pl. 92. 1882, Key Syst. Vict. Pl. 2: 39. *fig.* 100. 1885 & 1: 357. 1887-8, & Second Census Austral. Pl. 156. 1889; Maiden, Useful Native Pl. Austral. 579. 1889; C. Moore, Handb. Fl. New S. Wales 321. 1893; Rodway, Tasman. Fl. 128. 1903; Dixon, Pl. New S. Wales 215. 1906; Maiden & Betche, Census New S. Wales Pl. 172. 1916; Ewart, Handb. Forest Trees Vict. Foresters 406. 1925, & Fl. Vict. 941. 1930; Anderson, Trees New S. Wales ed. 2. 132, 338. 1947; Audas, Native Trees of Austral. 242 [1935]; Bean in Chittenden, Dict. Gard. 3: 1379. 1951; Curtis, Students' Fl. Tasman. 470. *fig.* 108. 1967.

Gymnelaea ligustrina (Vent.) L. Johnson, Contr. New S. Wales Natl. Herb. 2: 414. 1957.

Nestegis ligustrina (Vent.) L. Johnson in Degener, New Ill. Fl. Hawaiian Is. 300, *Nestegis*. 1958.

Tall evergreen shrub or small tree to 6 or even 12 m. high; young stems

minutely puberulous, often densely so, at least when young, or rarely almost glabrous. *Leaves* glabrous, petiole 2–7(–12) mm. long, glabrous or minutely puberulous when young, especially above; lamina thick or thickish, coriaceous, narrowly lanceolate or lanceolate (rarely narrowly ovate) (2–)3–6(–8.5) cm. long by (0.4–)0.7–1.2(–2.5) cm. broad, scattered punctate above and below; margin entire, flat; apex acute, tip acute or obtuse; base acute or subcuneate, attenuate into the petiole; venation obscure above and below, rarely with (4–)5(–6) primary veins per side just visible. *Inflorescence* axillary, 1–2(–3) per axil, decussate, 1.5–2.5(–3.5) cm. long, (7–)9–11(–13)-flowered (rarely 3–4 flowers at each node), glabrous, sometimes minutely and scattered puberulous, especially towards the base; upper bracts narrowly lanceolate, early deciduous, 1–1.3(–2) mm. long, ciliolate; basal bracts thickish, 1–1.5 mm. long, glabrous or minutely puberulous, acute, relatively early deciduous, fused bases of basal pair persistent. *Flowers* small, hermaphrodite (FIG. 3), yellowish to greenish-white; pedicels 2–6(–7) mm. long (4–10 mm. long in fruit). *Calyx* glabrous, very short tube 0.1–0.4 mm. long with 4 acute, triangular or ovate-triangular lobes 0.4–1 mm. long, usually entire. *Corolla* with 4 ovate, acute, slightly imbricate lobes, tube very short or nil, lobes paired, bases joined for 0.5–0.7 mm. at base of stamen, joined or adnate for 0–0.2 mm. between pairs, free portion of lobes 0.8–1.5 mm. long. *Stamens* 2, anthers 1.3–1.5 mm. long, elliptic or broadly elliptic with scarcely discernible terminal appendage; filament 0.1–0.4 mm. long. *Ovary* bottle-shaped, 0.8–1.5(–2) mm. long including gradually tapered style, 0.5 mm. long, with 2 narrow stigmatic lobes 0.5 mm. long (elongating to 1 mm. after corolla and stamens shed?). *Drupe* fleshy, black, purple, red, pink or white, ovoid-spherical, 8–12 mm. long by 6–10 mm. diameter; endocarp crustaceous, 0.1 mm. thick.

SELECTED EXSICCATAE. New South Wales. Tuross River, Apr. 1933, *Arnold* (NSW 33398); 8 miles W. of Pericoe, WSW. of Eden, about 900 m. alt., 28 May 1952, *Floyd* (NSW 33399).

Victoria. Upper Genoa River, *F. Mueller* (κ); Delegate Mt., May 1949, *Costin* (NSW 33400); Bonang, Feb. 1899, *Bäuerlen* (NSW 33402); about 31 miles NNE. of Buchan, Gippsland, 21 Jan. 1953, *Melville* 3043 (κ); Mt. Buffalo, subalpine, under 1200 m. alt., 11 Jan. 1950, *Stewart* (BRI 7909); 16 Mile Creek, near its confluence with Howqua River, about 730 m. alt., 11 Apr. 1959, *Muir*

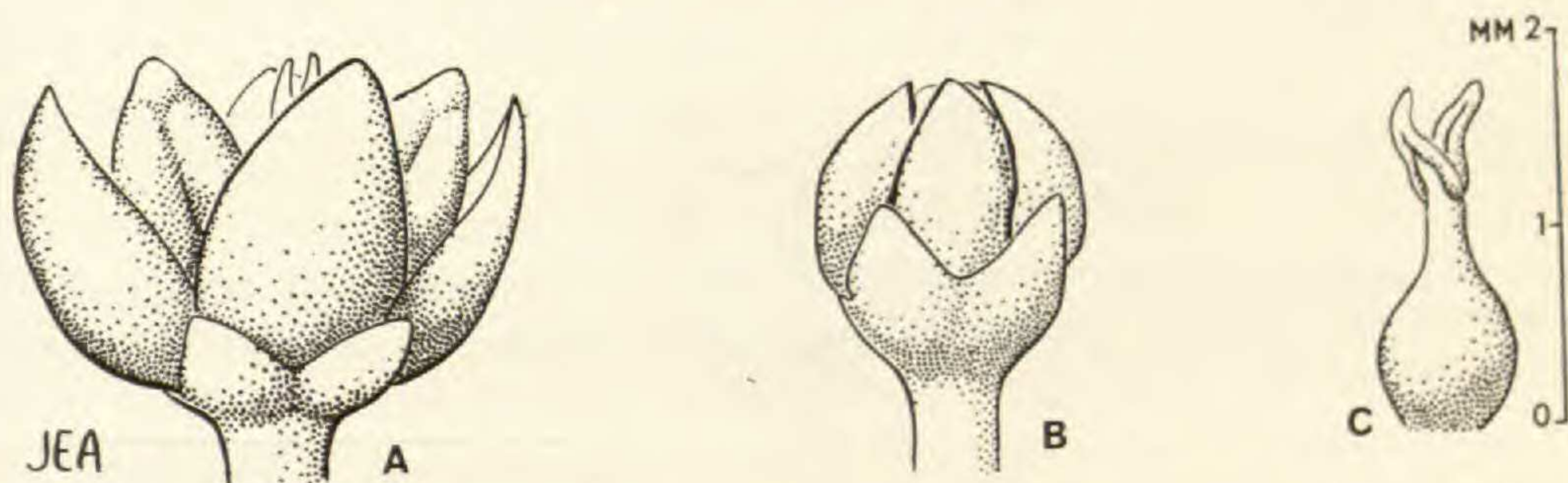


FIG. 3. *Notelaea ligustrina*. A, flower; B, bud; C, ovary. (Drawn from *Comber* 2189).

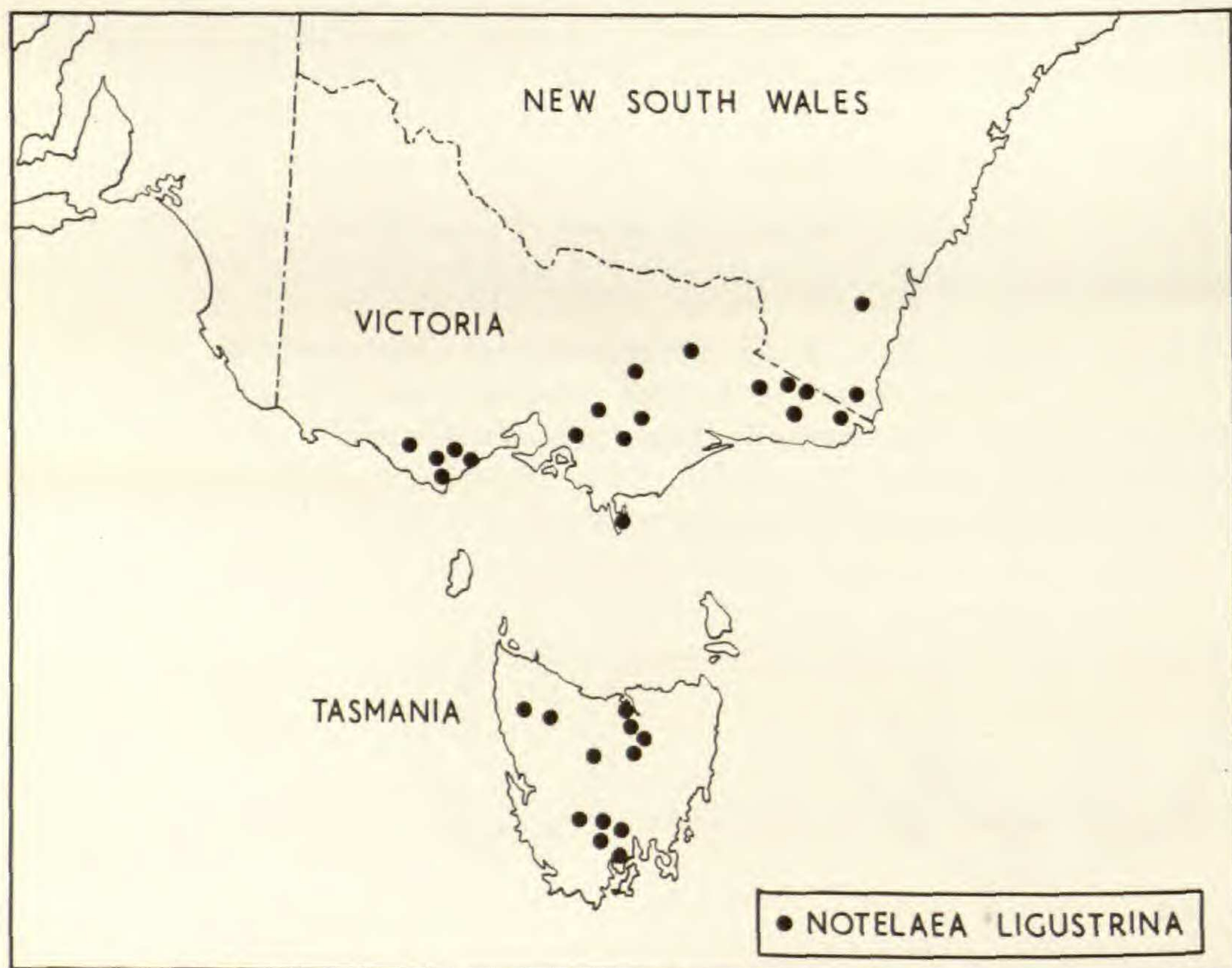
744 (A, K); Upper Yarra, Apr. 1911, *Staer* (NSW 33404); Sherbrooke Forest, Dandenong Ranges, Dec. 1932, *Willis* (K); Sealer's Cove, *Walters* (GH); Lutitt [Loutit] Bay, *F. Mueller* (BM); Cape Otway, *F. Mueller* (GH); Curdie's River, Nov. 1898, *Walter* (Z).

Tasmania. Hazelwood River near Waratah, edge of river, 180 m. alt., 3 March 1930, *Comber* 2189 (E, K); Port Dalrymple, *R. Brown* (BM); Cataract, Launceston, 20 Oct. 1880, *Simson* 551 (BRI 7908, LE); Launceston, 22 Jan. 1842, *Gunn* (BM, K); Ironstone, Dec. 1899, *Rodway* 6224 (NSW 33434); Mt. Field, Nov. 1895, *Rodway* 6223 (NSW 33433); Glen Leith, 14 Sept. 1840, *J. D. Hooker* (K) & 18 Dec. 1840, *Gunn* (GH, NSW 41468); River Derwent, 1804, *R. Brown* (BM, E); "ad ripas fluvium, in clima d'Entracasteaux," [1801], *Leschenault*, ex Herb. Jussieu & Ventenat (G, holotype). Without locality: [1804], *R. Brown* (E, G, K, LE, NSW 33406).

Cultivated. TASMANIA. Franklin Square, Hobart, 11 Apr. 1931, *Rodway* 6220 & 6221 (NSW 33436). NEW ZEALAND. Botanic Garden, Christchurch, Oct. 1962, *Sykes* 151/62 (A, CHR 125955).

This species has the southernmost distribution (see MAP 4) and, to judge from various field notes, grows in open sclerophyll forest or scrub dominated by species of *Eucalyptus* and, in Tasmania at least, on river banks throughout the State.

L. A. S. Johnson in his review of the family *Oleaceae* (Contr. New S. Wales Natl. Herb. 2: 395–418. 1957) transferred this species to the resurrected genus *Gymnelaea* (more correctly *Nestegis*) along with the native "olives" of New Zealand and species of *Osmanthus* from New Caledonia



MAP 4. Distribution of *Notelaea ligustrina*.

and Hawaii. The reason for doing this appears to have been the fact that the aestivation of the corolla in this species is different from that of the rest of those from Australia and not typical of *Notelaea*. The corolla in *N. longifolia*, the type species, and in the other species too, is induplicate-valvate in the bud (FIG. 1, A & B), but in *N. ligustrina* the lobes are imbricate (FIG. 3, B). However, the imbrication is not very strong, at least in herbarium specimens, where there appears to be a tendency to induplication, and some adjacent petals are distinctly valvate. Furthermore, when one considers the rest of the corolla structure it is seen to resemble, not that of *Osmanthus*, but other species of *Notelaea*. In *Osmanthus* there is a distinct corolla tube of varying length; in the New Caledonian species the corolla is campanulate with a tube at least 1.2 mm. but usually 1.5 mm. or more long. In *N. ligustrina* the tube is extremely short or nonexistent. At the base of the staminal filaments the adjacent corolla lobes are united for about 0.5 mm. but in the alternate position, where there is no stamen, they may, in some cases, be joined at the base by only 0.2 mm., in other cases they appear to be merely adnate, and in yet others they seem quite separate. This situation, with the petals in separate pairs, joined by the base of the filament, is comparable with that in the rest of *Notelaea*, and, in the family, otherwise found only in *Linociera* and *Chionanthus*.

There is an undoubted strong phytogeographic affinity between Tasmania (and the southeasternmost mainland of Australia) and New Zealand; and it is interesting to speculate how closely the native New Zealand "olives" which, following Johnson (*l.c.*), I have treated in a separate genus *Nestegis* (Jour. Arnold Arb. 44: 377-389. 1963), are related to *Notelaea ligustrina*. Characters of the corolla are of primary value in the Tribe *Oleeae* yet the New Zealand species are apetalous. However, there are other characters which can be considered. The New Zealand species are almost unique in the family, in the color of their ripe drupes, which is red or orange (although I observed yellow fruits on *Nestegis apetala* on Norfolk Island) and it is interesting to realize that those of *Notelaea ligustrina* are recorded as red, pink, and white, as well as purple and black (presumably very dark bluish purple), the usual color in the tribe. Nevertheless, the ripe fruits in *N. venosa* have been reported to be red or white on occasion and those of *N. punctata* as "varicolored."

It is not without significance, perhaps, to consider the sexuality of the flowers in *Notelaea*, *Nestegis*, and *Osmanthus* (the genus *Linociera* has not been studied in detail yet but it is suspected that in this respect it is comparable to *Notelaea*). In *Osmanthus* sects. OSMANTHUS and SIPHOSMANTHUS (from temperate and warm temperate Asia) and NOTOSMANTHUS (from New Caledonia) the flowers are androdioecious. In sect. LEIOLEA (tropical and warm temperate North and Central America and warm temperate and tropical Asia and Malesia) they are unisexual or hermaphrodite. In *Notelaea*, including *N. ligustrina*, they appear to be consistently hermaphrodite, but in *Nestegis* (that is the New Zealand species) they are unisexual or hermaphrodite. I am inclined to believe that

this latter condition has evolved separately from the basic hermaphrodite condition independently in *Osmanthus* sect. LEIOLEA and *Nestegis*. I also think that *Notelaea* is of Australasian origin and is related on the one hand to *Linociera* and on the other to *Osmanthus* and that just as unisexuality has appeared in sect. LEIOLEA so it has developed from the Australasian stock in the genus *Nestegis* (which has also become apetalous). I feel that *Notelaea ligustrina* stands somewhat between *Notelaea* proper and *Nestegis*, and as a reflection of this have proposed the separate section for its accommodation.

Notelaea ligustrina was described by Ventenat, along with his description of the genus *Notelaea* and its type species *N. longifolia*. His description for *N. ligustrina* was contained in an "observatio" and from it one can assume that the type is a specimen collected by Leschenault along the margins of rivers which open into the "golfe d'Entrecasteaux, près la terre de Dieman" and is to be found in the Jussieu Herbarium. The type might thus be expected to be in Paris but I have seen a specimen, ex herb. Jussieu, from Herb. Ventenat in the Geneva Herbarium, which I believe to be the holotype.

Notelaea sect. **Mischopetala**, P. S. Green, sect. nov.

A sectione NOTELAEA corollae et androecii structura differt. Corolla stamina etiam maturitate valde involvens; antherae parvae, sed connectivum et filamenta magna; corollae lobi geminati et maturitate cum staminibus stipitati.

TYPE SPECIES: *Notelaea johnsonii* P. S. Green.

The remarkable structure of the corolla and androecium of *Notelaea johnsonii*, which is the basis for establishing this monotypic section, is discussed more fully under the species. It appears to represent an independent development from the basic stock, as represented by sect. NOTELAEA.

9. **Notelaea johnsonii** P. S. Green, sp. nov.

Species inflorescentia elongata, staminibus parvis cum anthera parva sed connectivo filamentoque latis, corollae lobis etiam maturitate valde involutis et stipitatis, ab omnibus ceteris speciebus differt.

Evergreen shrub or small tree to 6 m. high; branchlets minutely puberulous to glabrate. *Leaves* glabrous, sometimes more or less punctate; petiole minutely puberulous or glabrate, 2–12 mm. long; lamina thickish, coriaceous, elliptic to narrowly elliptic, sometimes slightly lanceolate, (4–)7–10(–12) cm. long by (1–)1.8–3(–5) cm. broad; margin somewhat thickened, very slightly and extremely shallowly crenulate or entire, sometimes somewhat undulate; apex acute, occasionally slightly acuminate, fine pointed; base acute or obtuse, attenuate into the petiole; venation with primary veins visible above and below, sometimes almost obscure, secondary veins usually obscure, sometimes almost reticulate above and below,

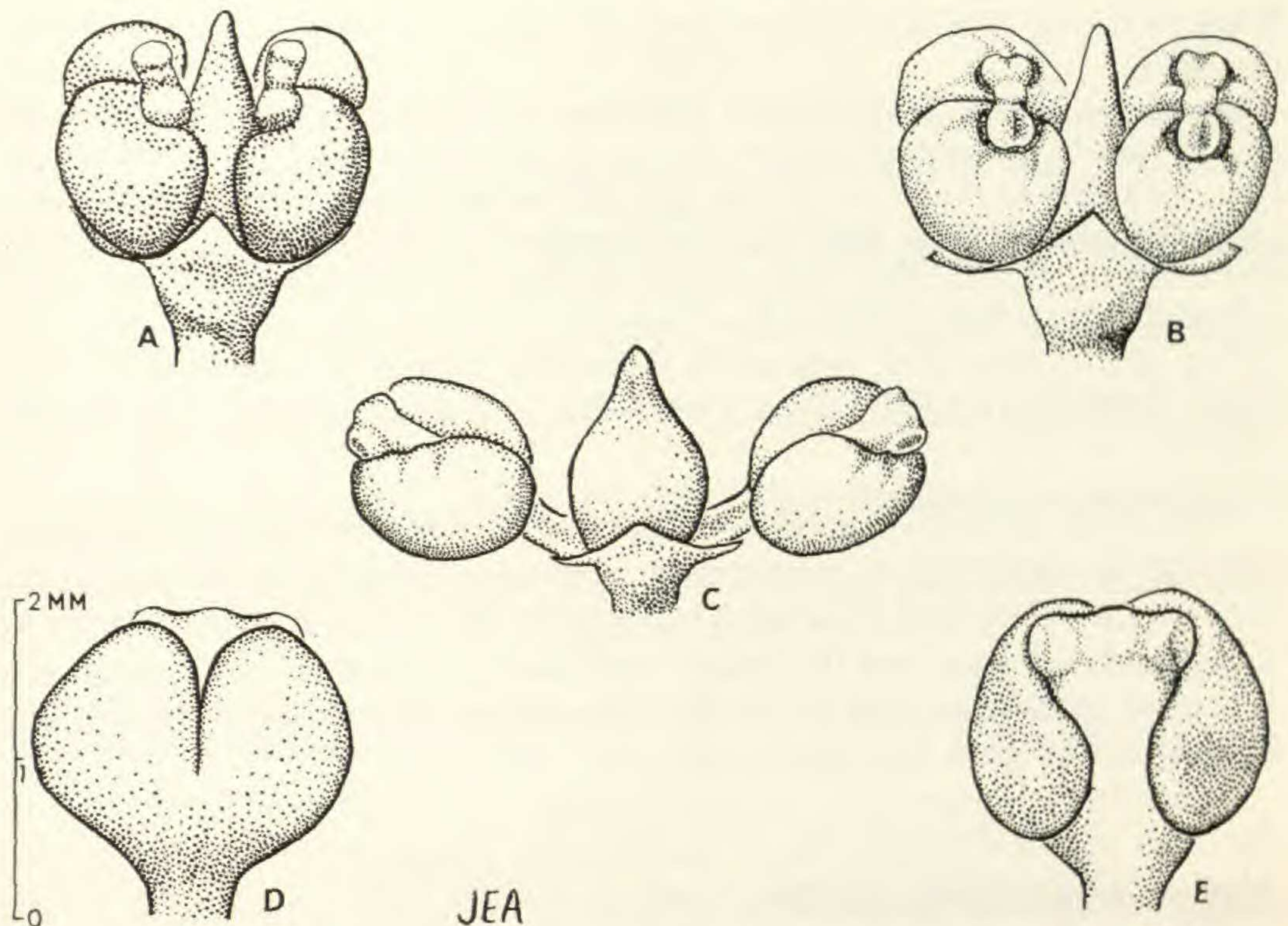


FIG. 4. *Notelaea johnsonii*. A & B, buds; C, flower; D, paired corolla lobes and stamen, dorsal view; E, paired corolla lobes and stamen, ventral view. (Drawn from NSW 42340).

(6-)7-12 primary veins per side. *Inflorescence* axillary, 1(-2) per axil, decussate, (4-)5-8 cm. long, 5-11-flowered, occasionally with 3(-4) flowers per node, rachis purplish pink (fide NSW 42340), slender, very minutely and scattered puberulous or with a very few small hairs, at least when young; upper bracts deciduous, unknown; basal pair of bracts thickish 2-3 mm. long, bluntish acute to long acute, glabrous or minutely scattered puberulent, more or less persistent during flowering then deciduous, except for the persistent fused bases. *Flowers* hermaphrodite (FIG. 4), bluish-black (fide NSW 42340); pedicels 3-15 mm. long. *Calyx* 0.75-1 mm. long, with 4 thin, more or less triangular lobes, 0.4-0.5 mm. long, minutely ciliolate, deciduous. *Corolla* of four, fleshy, rounded lobes, joined at the base in pairs 1.25-1.5 mm. long at first, concave and enclosing the stamens, eventually 2 mm. long on a "stalk" 0.5-0.75 mm. long. *Stamens* 2, purplish-pink (fide NSW 42340), 1.25 mm. long, with broad fleshy filament and two small rounded anther lobes 0.3 mm. long borne at the top, with lateral dehiscence. *Ovary* purplish-pink (fide NSW 42340), conical, 1.25-1.5 mm. high, sometimes minutely and scattered puberulent, with a barely perceptible style and very slightly bilobed stigma, 0.1 mm. long. *Drupe* bluish-black, fleshy, obliquely ellipsoid, 1.8-2 cm. long by 0.9-1 cm. diameter.

Queensland. MORETON DISTRICT: Robert's Plateau, Lamington National Park, 900-1200 m. alt., Feb. 1920, Tryon & White (BRI 7926, K), & 28 May 1929,

White 6039 (BRI 7916, K); National Park, Macpherson Range, Jan. 1919, *White* (BRI 9694).

New South Wales. Whian Whian State Forest, N. of Lismore, about 600 m. alt., 15 Jan. 1953, *Constable* (NSW 22217); Goonengerry, near Mullumbimby, 7 Nov. 1963, *Hayes in Green 1529* (A, K); Bungalow-Byron Bay road, 16 Nov. 1964, *Williams K18* (A, NSW 72725); Wyangarie State Forest, N. of Kyogle, about 900 m. alt., 21 Nov. 1963, *Hayes & Floyd 9* (A); Lismore, Aug. 1906, *Rothwell* (NSW 44053); Wollongbar Experimental Farm, east of Lismore, about 150 m. alt., 11 June 1957, *Johnson & Constable* (NSW 42340, holotype; K, isotype); Rous, 21 July 1925, *Cheel* (NSW 44055); Clarence River, 1868, *Beckler* (BM, K).

This most distinctive species, distinctive at least as far as the flower structure is concerned, is restricted to a relatively small area in northeast New South Wales and adjacent Queensland (MAP 2). Confined to rain-forest, and to judge from the limited field notes to basaltic and basic soils, it is often found surviving today in small patches of rain-forest species left isolated by the spread of cultivation.

The oldest specimen seen for this revision is that gathered by Beckler in the area of the Clarence River and sent to England by Ferdinand von Mueller where it was labelled *Notelaea venosa*. However, most of the material had been determined previously as *N. longifolia*, from which it can be quickly identified by the rather obscure venation of both the upper and lower surfaces of the leaves.

Detailed observations on fresh flowering material would be valuable, but the dried flowers, especially when softened in hot water, show the unusual corolla and stamens. Throughout the other species the petals are joined together in pairs, touch each other laterally and surround the ovary. In this species the pairs are separate even in young flowers (FIG. 4, A & B) and, as they reach maturity, they come to stand on either side of the ovary on a stalk-like structure which is possibly a development of the filament (FIG. 4, C-E). The individual stamens are distinctive too. The anthers are small and completely enclosed in the permanently concave and apparently fleshy corolla, except for the top of the connective and the two small and lateral openings of the pollen sacs (FIG. 4, D & E). Further observations and more collections may well improve our knowledge of this plant and its flower and perhaps show that this species should be distinguished as a separate genus; but for the present its distinctiveness in the genus *Notelaea* is indicated by the provision of a monotypic section.

It is a pleasure to name this plant after Mr. L. A. S. Johnson of the National Herbarium of New South Wales, who has made important contributions to the study of the Oleaceae, has kindly made extensive notes and first-hand field observations on the genus *Notelaea* available to me, and was joint collector of the type material.

EXCLUDED NAMES

Notelaea sect. *Picconia* (DC.) Knobl. in Engler & Prantl. Nat. Pflanzenfam. 4(2): 10. 1892 = *Picconia* DC.

- Notelaea austro-caledonica* Vieill. Bull. Soc. Linn. Normand. 9: 345. 1865 = **Osmanthus austro-caledonicus** (Vieill.) Knobl.
- N. azorica* Tutin, Jour. Bot. 71: 101. 1933 = **Picconia azorica** (Tutin) Knobl.
- N. badula* Vieill. ex Panch. & Sebert, Not. Bois Nouv.-Caléd. 184. 1874 = **Osmanthus austro-caledonicus** (Vieill.) Knobl.
- N. brachystachys* Schltr. Bot. Jahrb. 39: 228. 1906 = **Linociera brachystachys** (Schltr.) P. S. Green.
- N. collina* Schltr. Bot. Jahrb. 39: 229. 1906 = **Osmanthus austro-caledonicus** (Vieill.) Knobl.
- N. cymosus* Guillaum. Bull. Soc. Bot. France 89: 232. 1943 = **Osmanthus cymosus** (Guillaum.) P. S. Green.
- N. eucleoides* Schltr. Bot. Jahrb. 39: 229. 1906 = **Osmanthus austro-caledonicus** (Vieill.) Knobl.
- N. excelsa* (Ait.) Webb & Bert. Hist. Nat. Il. Canar. 3(2) (Phyt. Canar. sect. 3): 163. 1845 & t.186. 1848 = **Picconia excelsa** (Ait.) DC.
- N. flavicans* (Vahl) A. Dietr., Linn. Sp. Pl. ed. 6, 1: 246. 1831; D. Dietr. Synop. Pl. 1: 38. 1839 = **Noronhia emarginata** (Lam.) Thouars ex Hook.
- N. francii* Guillaum. Bull. Mus. Hist. Nat. Paris 28: 198. 1922 = **Linociera brachystachys** (Schltr.) P. S. Green.
- N. glandulosa* Panch. ex Guillaum. Ann. Mus. Col. Marseille II. 9: 192. 1911, *nomen in syn.* = **Olea paniculata** R. Br. (*O. thozetii* Panch. & Sebert).
- N. lanceolata* Teijsm. & Binn. Nat. Tijdschr. Ned. Ind. 27: 33. 1864 = **Linociera montana** (Bl.) G. Don. TYPE: Java, *M. Binnendyck* (BOG, K).
- N. monticola* Schltr. Bot. Jahrb. 39: 229. 1906 = **Osmanthus monticola** (Schltr.) Knobl.
- N. ? paniculata* Guillaum. Bull. Soc. Bot. France 89: 233. 1943 = **Linociera paniculata** (Guillaum.) P. S. Green.
- N. posua* D. Don. Prodr. Fl. Nepal. 107. 1825 = **Osmanthus fragrans** Lour.
- N. quadristaminea* (F. Muell.) Hemsl. Ann. Bot. 10: 243. 1896 = **Linociera quadristaminea** (F. Muell.) Knobl.
- N. rostrata* Teijsm. & Binn. Cat. Hort. Bogor, 122. 1866, *nom. nud.* = **Linociera montana** (Bl.) G. Don. TYPE: Java, *M. Binnendyck* (BOG, K).
- N. rostrata* Teijsm. & Binn. var. *latifolia* Teijsm. & Binn. l.c. 1866, *nom. nud.* = **Linociera montana** (Bl.) G. Don. TYPE: Java, *M. Binnendyck* (K).
- N. rostrata* Teijsm. & Binn. var. *oblongifolia* Teijsm. & Binn. l.c. 1866 = ? **Linociera montana** (Bl.) G. Don. TYPE: not seen.
- N. vaccinioides* Schltr. Bot. Jahrb. 39: 230. fig. 22. 1906 = **Osmanthus austro-caledonicus** (Vieill.) Knobl.
- N. zeylanica* Gardner ex Thwaites, Enum. Pl. Zeyl. 188. 1860, *nomen in syn.* = **Olea polygama** Wight.
- N. zollingeriana* Teijsm. & Binn. Nat. Tijdschr. Ned. Ind. 27: 33. 1864 = **Olea maritima** Wall. ex G. Don. TYPE: Java, *M. Binnendyck* (K, L).

ROYAL BOTANIC GARDENS, KEW
 RICHMOND, SURREY
 GREAT BRITAIN